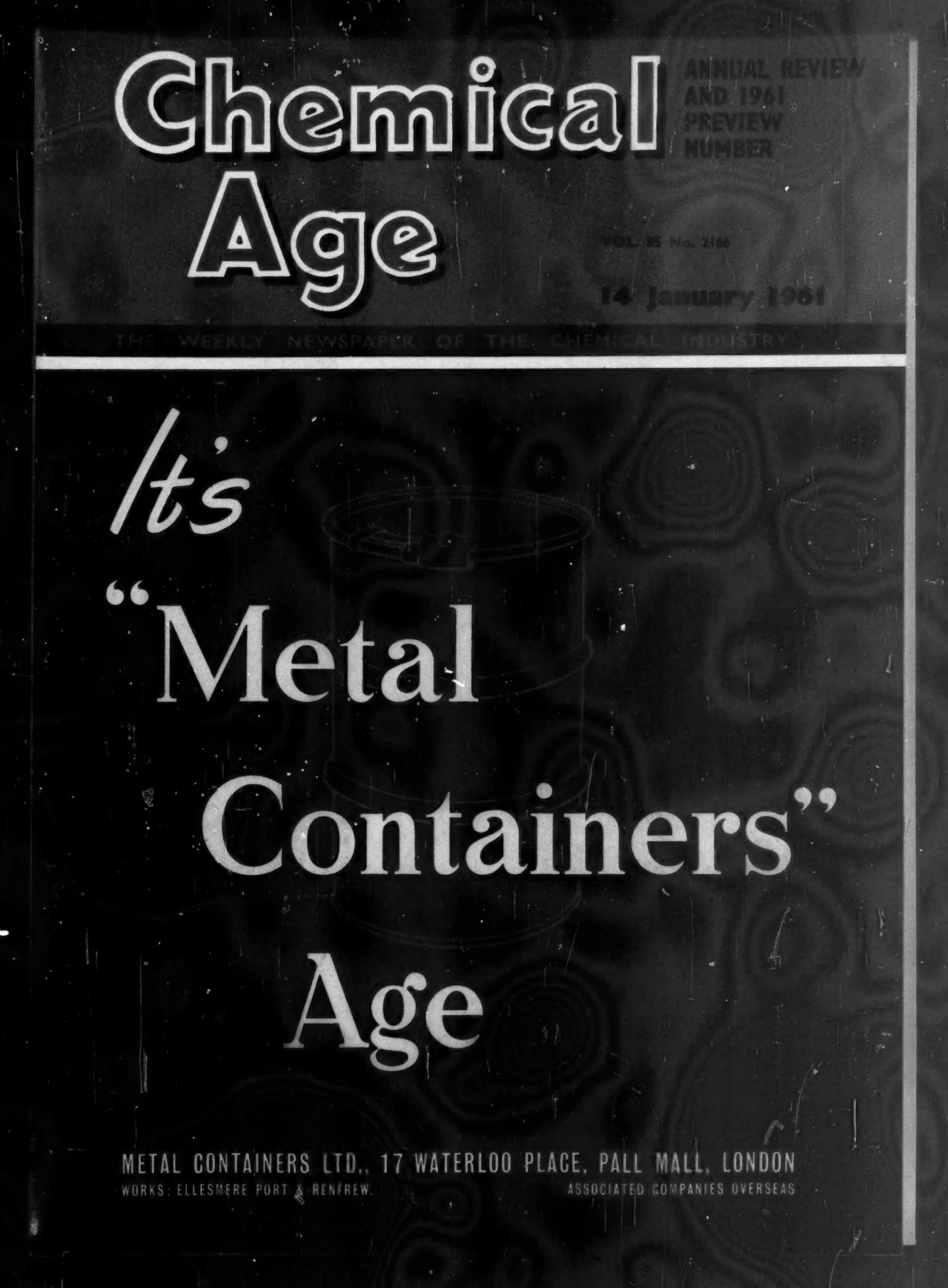
Chemical Age

ANNUAL REVIEW AND 1961 PREVIEW NUMBER

VOL. 85 No. 2166

14 January 1961

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY



"REDAC" PRODUCTS

ACID RESISTING EARTHENWARE

'HUNCOAT' REDAC

Enquiries Welcomed

ACID RESISTING
TILES • BRICKS
ACID TOWER
PACKINGS
RINGS AND BALLS

Successfully used in

GAILLARD TOWERS • ACID OIL
SETTLING TANKS • GAS WASHERS
CHIMNEY LININGS • ASH SLUICES
HYDROCHLORIC PICKLING TANKS
ETC.

B. WHITAKER & SONS, LTD.

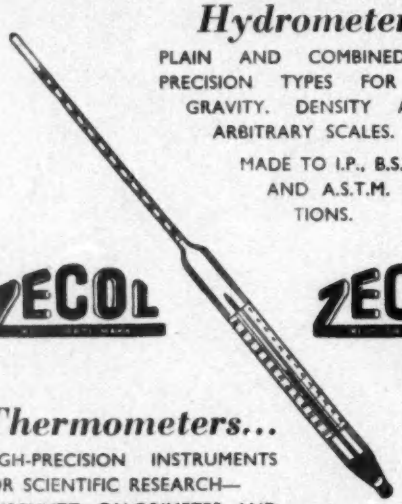
ST. STEPHENS HOUSE, WESTMINSTER

Phone: Whitehall 3616 *Works: ACCRINGTON, LANCS.* *Grams: Bricavity, Parl, London*

Hydrometers...

PLAIN AND COMBINED FORMS. PRECISION TYPES FOR SPECIFIC GRAVITY. DENSITY AND ALL ARBITRARY SCALES.

MADE TO I.P., B.S., S.T.P.T.C. AND A.S.T.M. SPECIFICATIONS.



ZECOL ZECOL EST. 1888

Thermometers...

HIGH-PRECISION INSTRUMENTS FOR SCIENTIFIC RESEARCH— ANSCHUTZ, CALORIMETER AND SECONDARY STANDARDS.

Combined form A.P.I. Hydrometer

Instruments N.P.L. Certified if required

G. H. ZEAL LTD.

Lombard Road, Morden Road, London, S.W.19

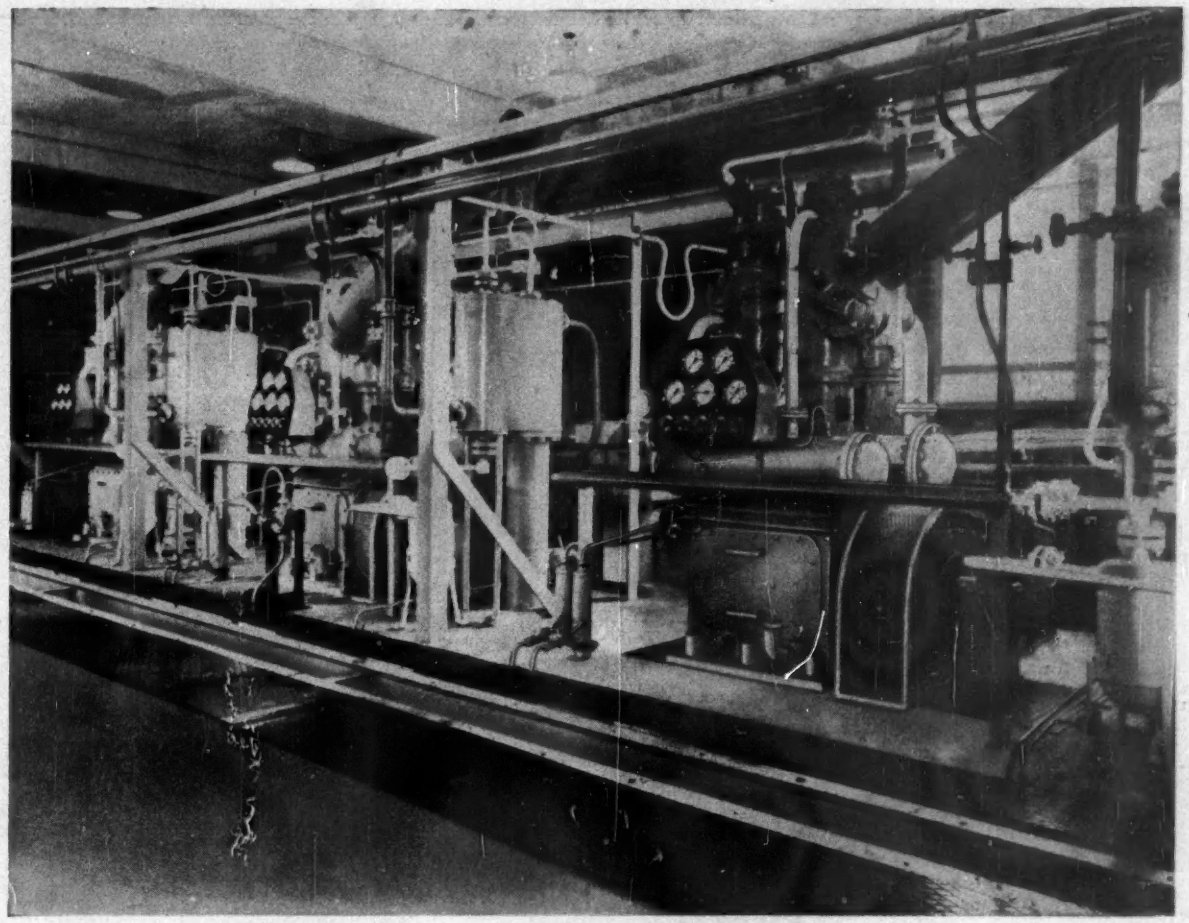
'PHONE: LIBERTY 2283/4/5/6

'GRAMS: ZEALDOM, SOUPHONE, LONDON

OXALIC ACID

KW CHEMICALS LTD

55/57 HIGH HOLBORN LONDON W.C.1 T.A. CHLORATE T.N. CHANCERY 7981/7



COMPRESSORS FOR SCIENTIFIC RESEARCH

Three Brotherhood two-crank four-stage compressors supplied to the University of Cambridge for a high speed wind tunnel installation.

Brotherhood compressors are designed to customers' exact requirements.

PETER BROTHERHOOD LTD

PETERBOROUGH ENGLAND

Compressor and power plant specialists for nearly a century

P5146

A

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

Page		Page
127	A.P.V. Co. Ltd., The	—
	A. W. Instruments (Guildford) Ltd.	126
154	Acalor (1948) Ltd.	129
	African Pyrethrum Technical Information Centre	—
234	Air Products Gt. Britain Ltd.	—
124	Air Trainers Link Ltd.	—
163	Albany Engineering Co. Ltd., The	—
	Alchemy Ltd.	—
114	Alginate Industries Ltd.	—
132	Allen, Edgar, & Co. Ltd.	—
178	Allen, Frederick & Sons (Poplar) Ltd.	30
162	Allis-Chalmers Great Britain Ltd.	65
	Alto Instruments (Gt. Britain) Ltd.	—
	Alumina Co. Ltd., The	60
	Ancorite Ltd.	61
186	Anglo-Dal Ltd.	—
	Anthony, Mark, & Sons Ltd.	—
191	Armour Hess Chemicals Ltd.	127
	Ashmore, Benson, Pease & Co. Ltd.	—
	Associated Electrical Industries Ltd. Motor & Control Gear Division	33
	Associated Electrical Industries Ltd. Turbine-Generator Division	63
183	Associated Lead Mfrs. Ltd.	—
G/Card	Audley Engineering Co. Ltd.	—
	B.S.A. Small Tools Ltd.	—
	B.T.R. Industries Ltd.	—
128	Baker Perkins Ltd.	67
	Baldwin Instrument Co.	—
161	Balfour, Henry, & Co. Ltd.	—
	Balfour Group of Companies, The	—
164	Barclay Kellett & Co. Ltd.	—
174	Barytes (Shielding Products) Ltd.	—
	Begg, Cousland & Co. Ltd.	—
	Belliss & Morcom Ltd.	58
	Bennett, H. G., & Co. (Gloves) Ltd.	—
153	Bennett, Sons & Shears Ltd.	—
G/Card	Berk, F. W., & Co. Ltd.	58
126	Black, B., & Sons Ltd.	—
2	Blackman, Keith, Ltd.	—
	Blaw Knox, Chemical Engineering Co. Ltd.	34 & 35
115	Blundell & Crompton Ltd.	126
	Boby, William, & Co. Ltd.	69
	Borax Chemicals Ltd.	—
193	Borax Consolidated Ltd.	—
4	Boulton, William, Ltd.	—
	Braby, Frederick & Co. Ltd.	103
	Brackett, F. W., & Co. Ltd.	119
	Brent, Peter, Ltd.	—
248	Bristol Piping Co. Ltd., The	—
117	British Acheson Electrodes Ltd.	—
	British Association of Chemists	—
	British Carbo Norit Union Ltd.	66
	British Ceca Co. Ltd., The	75
195	British Celanese Ltd.	45 & 49
	British Drug Houses Ltd., The	62
174	British Ermeto Corporation Ltd.	—
Spine	British Geon Ltd.	71
252	British LaBour Pump Co. Ltd.	—
	British Lead Mills Ltd.	—
	British Oxygen Engineering Ltd.	40 & 41
	British Resin Products Ltd.	—
156	British Rototherm Co. Ltd., The	—
141	British Steam Specialties Ltd., The	—
180	British Tar Products Ltd.	118
	British Thomson-Houston Co. Ltd., The	—
207	British Titan Products Co. Ltd.	—
	British Visqueen Ltd.	119
303	Broadbent, Thomas, & Sons Ltd.	73
151	Brotherhood, Peter, Ltd.	29
	Brough, E. A., & Co. Ltd.	—
	Bryan Donkin Co. Ltd., The	—
	Bulwark Transport Ltd.	122
178	Burnett & Rolfe Ltd.	—
160	Bush, W. J., & Co. Ltd.	111
165	Butterfield, W. P., Ltd.	—
	Butterworths Scientific Publications	—
	Callow Rock Lime Co. Ltd., The	—
254 & 262	Calmic Engineering Co. Ltd.	—
	Carless, Capel, & Leonard Ltd.	111
	Catterson-Smith, R. M., Ltd.	119
182	Causeway Reinforcement Ltd.	—
248	Cawley Plastics Ltd.	—
	Chappell, Fred, Ltd.	—
	Chemical Construction (G.B.) Ltd.	—
	Chemical Age Enquiries 131 &	132
	Chemical & Insulating Co. Ltd., The	—
120	Chemical Workers' Union	—
	Chemicals & Feeds Ltd.	32
	Chemolimpex	—
	Christy & Norris Ltd.	—
	Ciba (A.R.L.) Ltd.	47
146	Ciba Clayton Ltd.	—
	Ciech Ltd.	70
152	Citenco Limited	72
	Classified Advertisements 129 &	130
171	Clayton, Son & Co. Ltd.	—
126	Clydesdale Chemical Co. Ltd.	55
	Cohen, George, Sons & Co. Ltd.	—
129	Cole, R. H., & Co. Ltd.	—
	Colt Ventilation Ltd.	37
	Combustion Chemicals Ltd.	—
181	Comet Pump & Eng. Co. Ltd., The	—
	Consolidated Zinc Corporation Ltd.	—
	Constable & Co. Ltd.	—
G/Card	Constantin Engineers Ltd.	39
	Constructors John Brown, Ltd.	—
	Controlled Convection Drying Co.	—
	Cooke, Troughton & Simms Ltd.	—
	Coulter Electronics Ltd.	—
	Cox, Arthur H., & Co. Ltd.	—
	Cromil & Piercy Ltd.	126
	Crosfield, Joseph, & Sons Ltd.	—
	Crow Carrying Co. Ltd., The	—
121	Cruickshank, R., Ltd.	74
214	Curran, Edward, Engineering Ltd.	—
205	Cyanamid of Great Britain Ltd.	—
	Cyclo Chemicals Ltd.	—
114	Cyclops Engineering Co. Ltd., The	—
	Cygnet Joinery Ltd.	—
	Dalglish, John, & Sons Ltd.	—
140	Danks of Netherton Ltd.	—
	Davenport Engineering Co. Ltd.	122
159	Davey & Moore Ltd.	—
166	Davey, Paxman & Co. Ltd.	—
	Dawson, McDonald & Dawson Ltd.	128
	Distillers Co. Ltd., The	—
197	Distillers Co. Ltd., The (Chemical Div.)	101
	Distillers Co. Ltd., The (Industrial Group)	—
143	Dorr-Oliver Co. Ltd.	125
131	Doulton Industrial Porcelains Ltd.	—
164	Dowlow Lime & Stone Co. Ltd.	—
144	Dring & Fage Ltd.	—
227	Drummond Patents Ltd.	—
119	Dryden, T., Ltd.	68
	Dunlop Rubber Co. Ltd. (G.R.G. Dunclad)	—
122	E.C.D. Ltd.	—
	Electric Resistance Furnace Co.	—
	Electro-Chemical Engineering Co. Ltd.	—
	Electrothermal Engineering Ltd.	—
	Elga Products Ltd.	—
Book Mark	Elliott, H. J., Ltd.	—
	Elliott Brothers (London) Ltd.	—
135	Elmatic	—
145	Engelhard Industries Ltd. (Baker Platinum Division)	—
115 & 165	English Glass Co. Ltd., The	—
G/Card	Erinoid Ltd.	—
	Evans, Joseph, & Sons (Wolverhampton) Ltd.	—
	Everard & Co. Ltd.	—
166	Farnell Carbons Ltd.	—
	Fawcett, Preston & Co. Ltd.	—
150	Feltham, Walter H., & Son Ltd.	—
186	Ferris, J. & E., Ltd.	—
220	Ferrostatics Ltd.	—
	Fibrolene	—
	Fielden Electronics Ltd.	53
147	Film Cooling Towers (1925) Ltd.	—
113	Film Refuelling Ltd.	—
133	Foster Instrument Co. Ltd.	—
	Foxboro-Yoxall Ltd.	52
	Foyle, W. & G., Ltd.	—
	Freeman, Taylor Machines Ltd.	—
	Freeman, William, & Co. Ltd.	117
208	Fullers' Earth Union Ltd., The	—
110	G.Q. Parachute Co. Ltd.	—
	Gallenkamp, A., & Co. Ltd.	—
	Gascoigne, Geo. H., Co. Ltd.	—
	Gas Council, The	—
	Geigy Co. Ltd., The	105
	General Precision Systems Ltd.	—
	Girlestone Pumps Ltd.	—
	Glass Manufacturers' Federation	76
	Giusti, T., & Son Ltd.	—
148	Glebe Mines Ltd.	—
	Goodburn Plastics Ltd.	—
	Goodyear Pumps Ltd.	—
155	Graviner Mfg. Co. Ltd.	—
185	Glazebrook, M. & W., Ltd.	—
182	Greeff, R. W., & Co. Ltd.	—
	Halex (Bex Industrial)	—
110	Haller & Phillips Ltd.	—
	Hamilton Company Inc.	38
144	Harris (Lostock Gralam) Ltd.	—
	Harvey, G. A., & Co. (London) Ltd.	—
6	Haworth, F. (A.R.C.) Ltd.	51
	Heafield Industries Ltd.	68
	Hearson, Charles, & Co. Ltd.	—
112	Heathway Machinery Co. Ltd.	—
	Helmets Ltd.	—
149	Hercules Power Co. Ltd.	—
	Hodgson, Richard, & Sons	—
165	Holden, Chris., Ltd.	—
	Humphreys & Glasgow Ltd.	—

(*Continued on page 32*)

FOR

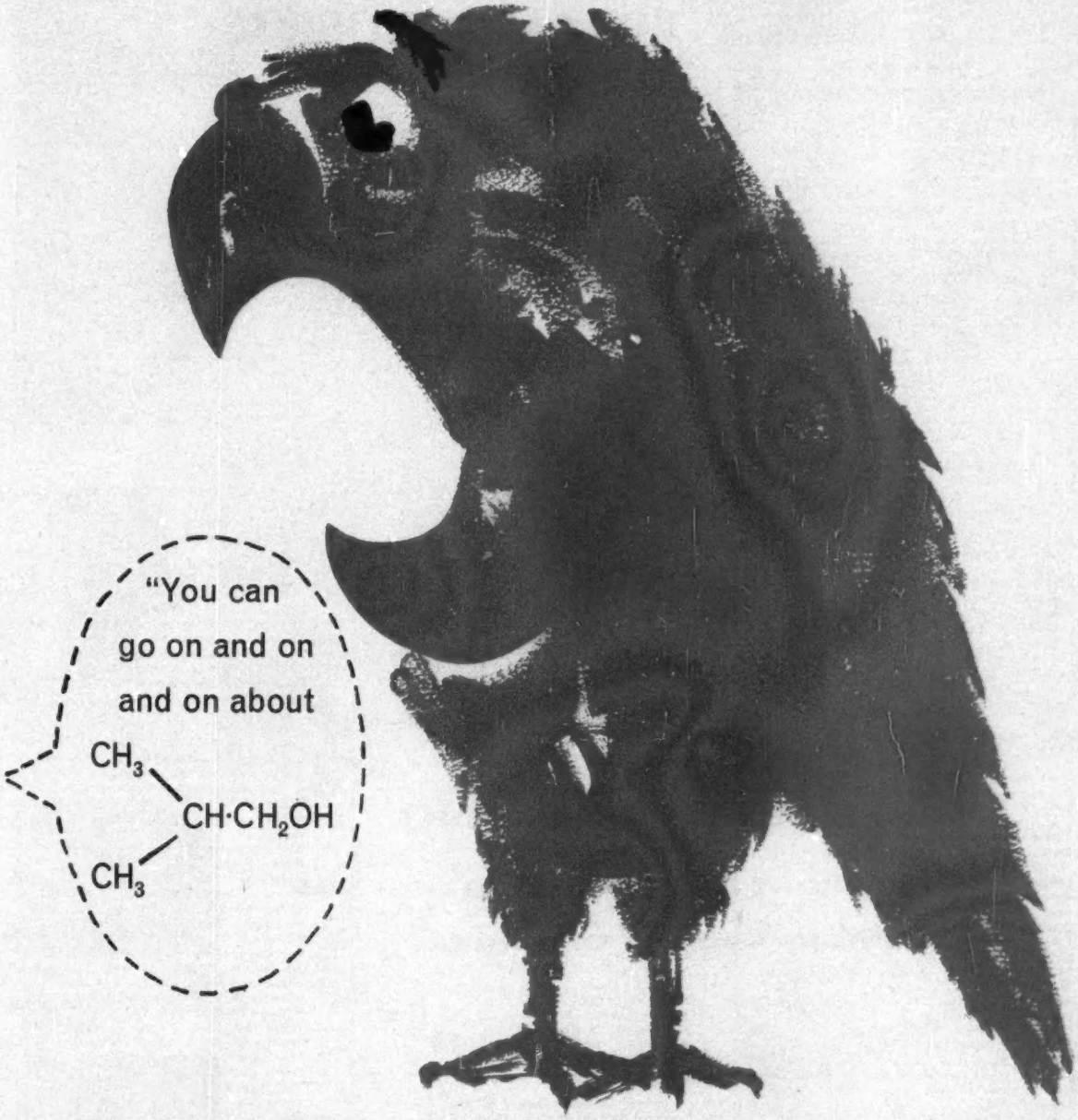
ZINC ACETATE

CONSULT

FREDERICK ALLEN & SONS (POPLAR) LTD.

PHOENIX CHEMICAL WORKS, UPPER NORTH STREET, LONDON, E.14.

Telephone: EAST 2673 (5 lines) *Cables: NITRIC, POP, LONDON*



it'll always be Isobutyl Alcohol to me—
and I get it from I.C.I."

I.C.I. give prompt delivery of top-quality, top-performance solvents.

ISOBUTYL ALCOHOL NORMAL BUTANOL 'AROMASOL' H 'AROMASOL' L
ISOPROPYL ALCOHOL ACETONE 'IMSOL' A 'IMSOL' M

for full information,
or a visit from a representative,
get in touch with the
nearest I.C.I. Sales Office
or with

ICI

HS.3

IMPERIAL CHEMICAL INDUSTRIES LIMITED, LONDON, S.W.1.

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

Page		Page
139	Huntingdon, Heberlein & Co. Ltd.	—
	I.C.I. (Billingham)	—
	I.C.I. Catalysts	—
	I.C.I. General Chemicals Division	—
	I.C.I. Ltd. Heavy Organic Chemicals	31
	I.C.I. Metals Titanium D.	—
	I.C.I. Plastics—Darvic	—
	I.C.I. Plastics—Fluon	—
	I.C.I. Ltd. (Plastics Division), Corvic	—
	I.C.I. (Florube) Ltd.	—
	I.M.P.A. Ltd.	—
173	International Furnace Equipment Co. Ltd., The	—
	Interscience Publishers Ltd.	—
	Isopad Ltd.	—
142	Jackson, J. G., & Crockatt Ltd.	128
167	Jenkins, Robert, & Co. Ltd.	—
	Johnson, Matthey & Co. Ltd.	—
134	Johnsons of Hendon Ltd.	—
	Jones & Stevens Ltd.	—
159	K.D.G. Instruments Ltd.	—
	K & K Laboratories Inc.	64
184	K.W. Chemicals Ltd.	Cover ii
	Kaylene (Chemicals) Ltd.	—
158	Kellie, Robert, & Sons Ltd.	—
	Kellogg International Corporation	56
136	Kernick & Son Ltd.	—
301	Kestner Evaporator & Engineering Co. Ltd.	66
	Kestner Evaporator & Engineering Co. Ltd. (*Keebush*)	—
	Kestner (Industrial Safety) Ltd.	—
116	Kleen-e-ze Brush Co. Ltd., The	—
184	Laboratory Apparatus & Glass Blowing Co.	—
	Laboratory & Electrical Engineering Ltd.	—
	Langley Alloys Ltd.	—
112	Lankro Chemicals Ltd.	—
203	Laporte Chemicals Ltd.	—
	Laporte Industries Ltd.	—
122	Leek Chemicals Ltd.	—
118	Leigh & Sons Metal Works Ltd.	128
	Lennig, Charles & Co. (Great Britain) Ltd.	9
	Lennox Foundry Co. Ltd.	—
142	Light, L., & Co. Ltd.	—
111	Lind, Peter, & Co. Ltd.	—
126	Liquid Solid Separations Ltd.	—
	Lloyd & Ross Ltd.	62
	Lock, A. M., & Co. Ltd.	126
Back Cover	London Aluminium Co. Ltd., The	—
176	London Sand Blast Decorative Glass Works Ltd., The	—
	Longman Green & Co. Ltd.	124
144	Longworth Scientific Instruments Co.	74
165	Lord, John L., & Son	—
	Loughborough Glass Co. Ltd.	123
	Lurgi Verwaltung GmbH	—
150	McCarthy, T. W., & Sons	—
	MacLellan, George, & Co. Ltd.	—
	McMurray, F. J.	—
175	Maine, B. Newton, Ltd.	117
116	Manesty Machines Ltd.	—
199	Marchon Products Ltd.	115
	Marston Excelsior Ltd.	—
	May & Baker Ltd.	—
Front Cover	Metal Containers Ltd.	Front Cover
G/Card	Metalock (Britain) Ltd.	57
152	Metcalf & Co.	—
	Metering Pumps Ltd.	—
	Metropolitan-Vickers Electrical Co. Ltd.	—
120	Middleton & Co. Ltd.	64
	Mineralöle Import und Export GmbH	—
	Mirrlees Watson Co. Ltd., The	—
	Mirvale Chemical Co. Ltd., The	—
	Mitchell, L. A., Ltd.	—
157	Mitchell Cotts Co. Ltd.	—
108	Mond Nickel Co. Ltd., The	—
115	Monkton Motors Ltd.	—
	Monsanto Chemicals Ltd.	113
	Morgan Refractories Ltd.	—
	Moritz Chemical Engineering Co. Ltd.	—
	National Coal Board	—
	National Industrial Fuel Efficiency Service	—
106	Neckar Water Softener Co. Ltd.	70
137	Negretti & Zambra Ltd.	—
	Newnes, George, Ltd.	120
	Nordac Ltd.	53
	Normalair Ltd.	—
	Northgate Traders (City) Ltd.	—
	Nuovo Pignone	—
	Nu-Swift Ltd.	—
150	Odoni, Alfred A., & Co. Ltd.	—
G/Card	Oil & Colour Chemists' Association	—
144	Optical-Mechanical (Instruments) Ltd.	—
	Orthos (Engineering) Ltd.	—
	Otford Paper Sack Co. Ltd.	—
G/Card	P.G. Engineering Ltd.	—
	Palfrey, William, Ltd.	—
8	Paterson Engineering Co. Ltd., The	—
	Penrhyn Quarries Ltd.	128
221 & 265	Permutit Co. Ltd., The	—
G/Card	Petrocarbon Developments Ltd., The	—
	Plastic Constructions Ltd.	—
213	Plastic Filters Ltd.	—
168	Platon, G. A., Ltd.	—
	Podmores (Engineers) Ltd.	—
238	Polypenco Ltd.	—
243	Polysius Ltd.	—
246	Pool, J. & F., Ltd.	—
	Pott, Cassels & Williamson Ltd.	—
	Potter, F. W., & Soar Ltd.	—
236	Powell Duffryn Carbon Products Ltd.	107
	Power-Gas Corporation Ltd.	109
	Premier Colloid Mills Ltd.	—
123	Pressoturn Ltd.	—
152	Price Stutfield & Co. Ltd.	—
	Prodorite Ltd.	—
	Price's (Bromborough) Ltd.	—
	Pyrene Co. Ltd.	—
	Pyrene-Panorama Ltd.	—
156	Pyrometric Equipment Co. Ltd., The	—
	Q.V.F. Ltd.	—
	Quickfit & Quartz Ltd.	—
142	Reade, M. G.	—
226	Reads Ltd.	—
	Reavell & Co. Ltd.	—
146	Rediweld Ltd.	—
	Resinform Ltd.	—
	Rheem Lysaght Ltd.	Cover iv
	Rhodes, B., & Son Ltd.	—
	Richardson Scale Co. Ltd.	—
	Richmond Welding Co. Ltd.	128
228	Rosin Engineering Co. Ltd.	—
	Ross Ensign Ltd.	—
180	Rotameter Manufacturing Co. Ltd.	—
154	S.P.E. Company Ltd.	—
126	Sandiacre Screw Co. Ltd., The	—
	Saunders Valve Co. Ltd.	36
	Scientific Design Co. Inc.	—
164	Scottish Tar Distillers Ltd.	—
	Sharples Centrifuges Ltd.	—
3	Sheepbridge Equipment Ltd.	—
	Shell Chemical Co. Ltd.	—
	Shell-Mex & B.P. Ltd.	—
	Shell Industrial Oils	—
	Siebe, Gorman & Co. Ltd.	—
	Sifam Electrical Instrument Co. Ltd.	—
34	Simon, Richard, & Sons Ltd.	42
	Smith, Leonard (Engineers) Ltd.	—
	Sipon Products Ltd.	—
	Sojuzchimexport	44
253	Southern Instruments Ltd.	—
	Spence, Peter, & Sons Ltd.	—
187	Spencer Chapman & Messel Ltd.	Cover iii
	Standard Chemical Co.	—
	Stanfield & Carver	—
302	Stanton Instruments Ltd.	46
	Staveley Iron & Chemical Co. Ltd.	—
	Steel Drums Ltd.	—
118	Steel, J. M., & Co. Ltd.	—
	Stockdale Engineering Co. Ltd.	61
	Sturge, John & E., Ltd.	121
	Super Oil Seals & Gaskets Ltd.	72
	Surface Protection Ltd.	—
140	Synthite Ltd.	—
134	"T.P." Chemical Engineering Co. Ltd.	—
169	Taylor Rustless Fittings Co. Ltd.	—
	Taylor Stainless Metals Ltd.	—
223	Tempair Ltd.	—
148	Thermal Syndicate Ltd., The	Cover iii
174	Titanium Metal & Alloys Ltd.	—
141	Towers, J. W., & Co. Ltd.	—
241 & 256	Tylors of London Ltd.	—
	Uhde, Friedrich, GmbH	—
176	Unicone Co. Ltd., The	118
188	Unifloc Ltd.	54
	Unilever Ltd.	—
	Union Carbide Ltd.	—
	Unit Superheater & Pipe Co. Ltd., The	—
172	United Filters & Engineering Co. Ltd., The	—
G/Card	Universal-Matthey Products Ltd.	—
	Volcrepe Ltd.	59
176	W.E.X. Traders Ltd.	—
177	Walker, P. M., & Co. (Halifax) Ltd.	—
179	Waller, George, & Son Ltd.	—
	Ward, Thomas W., Ltd.	59
	Warren-Morrison Ltd.	72
136	Watson, Laidlow, & Co. Ltd.	—
	Watson-Marlow Air Pump Co.	—
	Wellington Tube Works Ltd.	—
225	Whitaker, B., & Sons Ltd.	Cover ii
	Widness Foundry & Engineering Co. Ltd.	—
244	Wilcox, W. H., & Co. Ltd.	—
160	Wilkinson, James, & Son Ltd.	127
130	Williams & James (Engineers) Ltd.	—
	Witco Chemical Co. Ltd.	—
	Wood, E., Ltd.	—
130	Wood, Harold, & Sons Ltd.	128
172	Worcester Royal Porcelain Co. Ltd., The	74
	Wynn (Valves) Ltd.	—
138	Yorkshire Tar Distillers Ltd.	—
	Young, A. S., & Co.	122
138	Zeal, G. H., Ltd.	Cover ii

CHEMICALS AND FEEDS LIMITED

ADELAIDE HOUSE · KING WILLIAM STREET · LONDON E.C.4

Tel.: Mansion House 9621 (5 lines) *Cables: "Chemifeed" London* *Telex 23209*

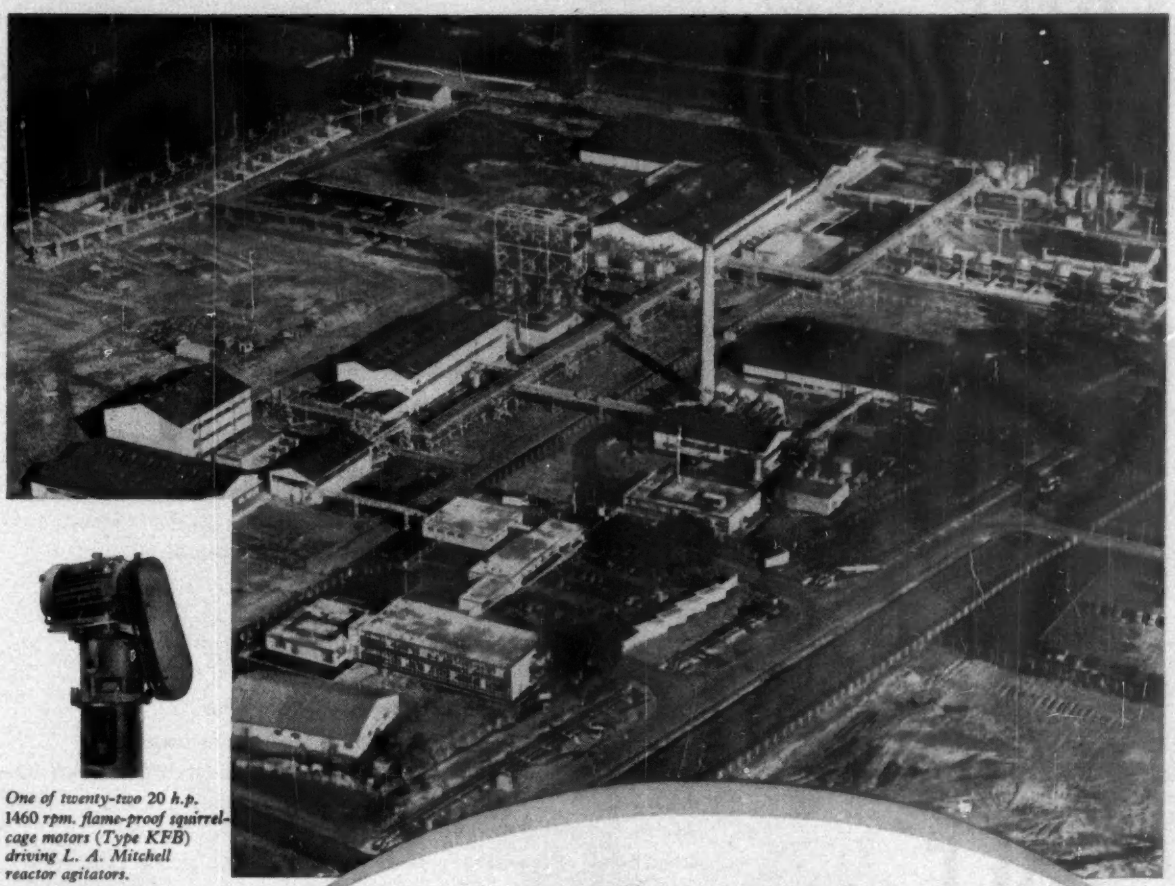
ZINC CARBONATE - PRILLED UREA

- ZINC SULPHATE MONOHYDRATE -

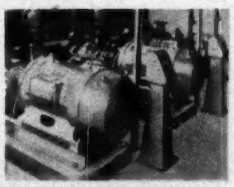
PEARL ESSENCE - BENTONITE

MANGANESE CARBONATE (Rhodochrosite)

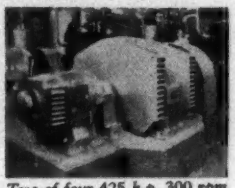
Associated with: P. Leiner & Sons (Wales) Ltd., The Glamorgan Alkali & Acid Co. Ltd., and other U.K. and Overseas manufacturers



One of twenty-two 20 h.p. 1460 rpm. flame-proof squirrel-cage motors (Type KFB) driving L. A. Mitchell reactor agitators.



Two of four 100 h.p. 2920 r.p.m. squirrel-cage motors (Type HRSP), with pedestal control stations, driving water pumps.



Two of four 425 h.p. 300 rpm. salient pole synchronous motors (Type SM) with overhung exciter driving L. Sterne's refrigeration compressor.

Over 650 AEI Motors

for one of the world's most modern synthetic rubber plants

The new plant of the International Synthetic Rubber Company at Hythe is capable of producing 70,000 tons of synthetic rubber a year using butadiene and styrene as the main raw materials. Three grades of rubber are produced suitable for making motor vehicle tyres, coloured rubber products and general products. The motors ranging from 0.25 to 620 h.p. and used for driving pumps and compressors, were all supplied by AEI. In addition, AEI made and erected the switchgear, transformers and other substation equipment for this plant.

AEI

Associated Electrical Industries Limited

Motor and Control Gear Division

RUGBY & MANCHESTER

COMBINING THE MOTOR AND CONTROL GEAR INTERESTS OF BTH AND M-V

A5580

FROM FIRST SURVEY TO THE SNIP OF THE TAPE...

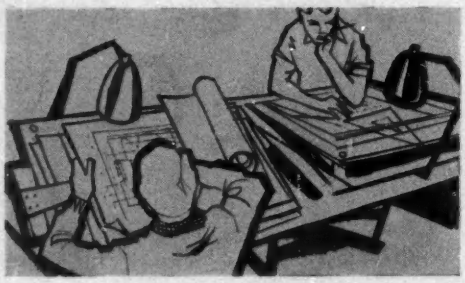
At every stage of chemical and petroleum plant construction, let Blaw Knox experience see you through. Fifty years' leadership in every aspect and every phase of this specialised type of work guarantees high quality designs which ensure the use of the latest processes and methods of operation to anticipate future trends and markets.

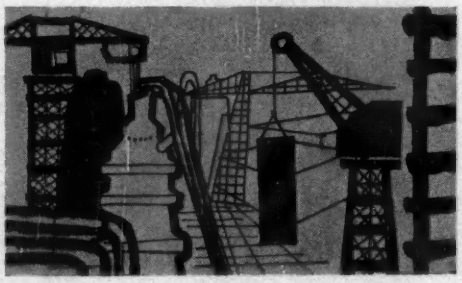
Technical appraisal—economic survey—site selection—plant design and engineering—procurement—complete erection (including civil engineering and building)—training of operatives—initial operation.

Blaw Knox will handle any type or size of project, including single stages, and will be pleased to advise you on any developments you may have in mind.

Blaw Knox specializes in Process Plant and Equipment for :

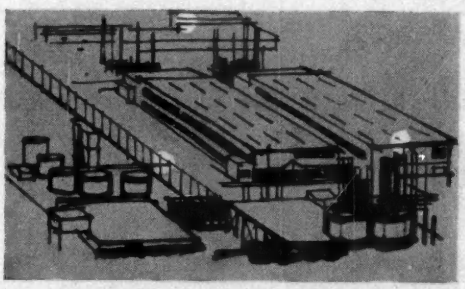
Industrial chemicals, fine chemicals, pharmaceuticals, organics, dyes, intermediates, food processing, fertilizers, pesticides, high and low temperature processes, natural and synthetic fuels, metals processing and treatment, waste treatment, chlor-alkali production, resins and plastics, fats and oils, petroleum and petrochemicals.





BLAW KNOX CHEMICAL ENGINEERING COMPANY LIMITED

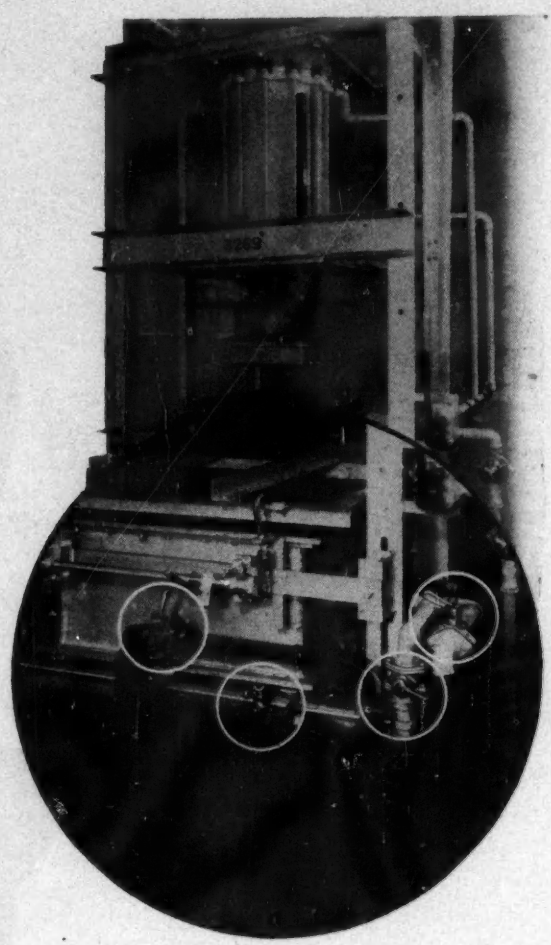
20, Eastbourne Terrace, London, W.2. Paddington 9051.



BLAW KNOX

More about the

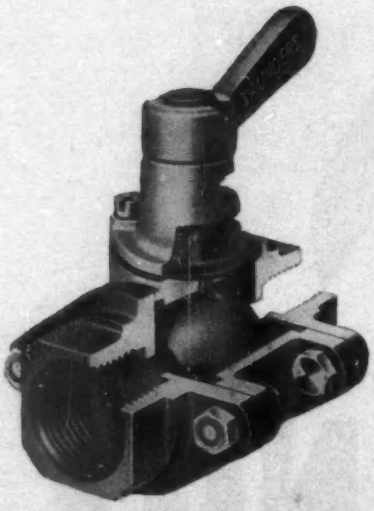
SAUNDERS 'M' VALVE



Development continues — the size range extends until it now comprises 8 capacities from ½" to 3". Scope increases and here, in the illustration, is a Vacuum Forming Machine built by General Celluloid Co. Ltd., who have fitted these Spherical Plug Valves in the Vacuum and Compressed Air systems for controlling operations.

o o

Quick acting, straight and full bore with flexible seats that tighten their seal as fluid pressure increases. Spindle leakage is prevented by a flexible diaphragm which unites the fixed body and movable spindle.



Nylon coated plugs are now standard on all sizes–

This reduces torque and consequent seat wear and at the same time permits higher working pressures —(up to 250 p.s.i. on small models).

SAUNDERS VALVE COMPANY LIMITED

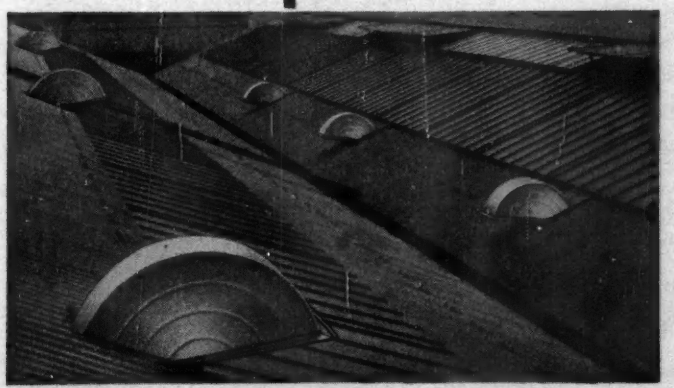
DIAPHRAGM VALVE DIVISION

CWMBRAN · NEWPORT · MONMOUTH · *Telephone:* Cwmbran 3080-9

Problem: CONDENSATION

Solution: COLT Ventilation

Place: JOHN BULL RUBBER CO LTD
GRIMSBY



The pressing of rubber mouldings at the large factory of the John Bull Rubber Co. Ltd. was raising humidity and causing condensation under certain climatic conditions. At these times sections of the structure and floor were covered with moisture and the working conditions were unpleasant.

Colt were called in and after a survey recommended the installation of Inflow Units and SRC 2046 ventilators. There is no condensation problem now at the factory, and Colt have added another success to a fine record. It is a record which has brought repeat orders from many world-famous concerns. Ask your Secretary to send for a free Manual to Dept. 39.

COLT VENTILATION LIMITED SURBITON SURREY Telephone: Elmbridge 0161

Accurate liquid discharge to .01 ul, with...

Hamilton Microliter Syringes*

Now you can make accurate liquid discharges in the range of 500 ul to 0.01 ul by direct reading of the Hamilton Microliter Syringes. These instruments have proved very valuable as research and analysis tools in chemistry, gas chromatography, biology, and medicine. They are made of precision bore glass and stainless steel plungers. They are available with cemented needles, detachable needles, Chaney adaptors, and in gas-tight models. At the right are the basic Hamilton Syringes:

Hamilton Microliter Syringes*
(with cemented needle)

Model	Capacity	Price
7001N	1.0 ul	$35.00
701N	10.0 ul	$18.00
705N	50.0 ul	$18.00
710N	100.0 ul	$18.00
725N	250.0 ul	$18.00
750N	500.0 ul	$18.00

Note: Price listed is F.O.B. Whittier, California, U.S.A.

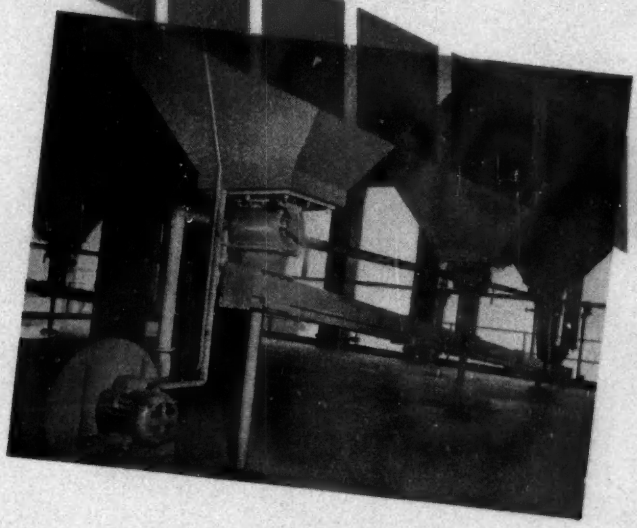
WRITE FOR CATALOG OF HAMILTON PRODUCTS

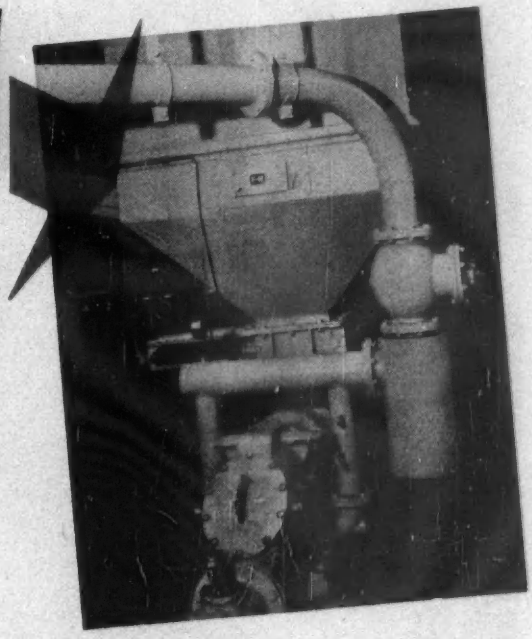
*Protected under U.S. Patent Number 2933087 or Patent Pending

HAMILTON COMPANY, INC. P.O. Box 307 • Whittier, California

Gas Chromatography Ltd. London, England——Shandon Scientific Co. Ltd. London, England

100 TONS PER HOUR





OR 5 TONS/DAY OF POWDERED MATERIALS CAN BE HANDLED EFFICIENTLY BY

*The * "F-H Airslide" Fluidizing Conveyor & Fuller-Kinyon conveying system "a combination that's hard to beat."*

The * "F-H Airslide" Fluidizing conveyor working in conjunction with Fuller Kinyon conveying equipment has the following outstanding advantage:—

1. High handling rates, over comparatively long transport distances.
2. Low power consumption due to operation at low pressure.
3. Low maintenance costs, due to minimum of moving parts and lubrication points.
4. Cleanliness.
5. Simplicity.
6. Quietness.

Constantin ENGINEERS LIMITED

* U.K. Registered Trade Mark

Write for details of all Fuller pneumatic handling equipment including the * "F-H Airslide" Fluidizing Conveyor

123 VICTORIA STREET, LONDON, S.W.1

TELEPHONE: TATE GALLERY 0637

SOLE LICENSEES OF FULLER Co., CATASAUQUA, Pa., U.S.A., FOR THE MANUFACTURE AND SALE OF FULLER EQUIPMENT IN GREAT BRITAIN

Erection of a Tonnage Oxygen installation for use in the gasification of solid fuel. The plant consists of two units each capable of producing 100 tons per day of oxygen under pressure and was built by The British Oxygen Company Limited. The air separation units were pre-erected at their Edmonton Works and supplied in packaged form.

TGA BOC 28A

Tonnage Oxygen and Nitrogen Plant

PLANTS FOR AIR AND GAS SEPARATION

BOC has unrivalled experience in building a wide range of plants specifically designed to meet the diverse requirements of the Chemical, Steel and Gas industries. Continuous bulk demands for atmospheric gases are best met by plant installed close to the point of usage. The consumer can either own and operate such plant or take supplies by pipeline from a BOC installation.

PURIFICATION PLANTS

BOC are specialists in the design and construction of plants for the purification of nitrogen, argon, helium and the rare gases. Very high purity products can be obtained.

ANCILLARY EQUIPMENT

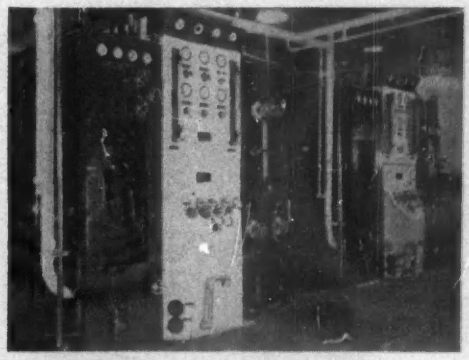
All types of ancillary equipment, associated with air separation plants, are designed and manufactured by BOC. These include a wide range of liquid storage tanks, pumps, evaporators and compressors.

CRYOGENIC ENGINEERING

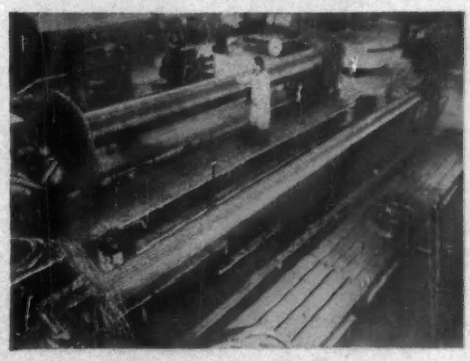
The specialist skill and knowledge accumulated over many years enables BOC to provide a comprehensive service to all users of atmospheric gases and in cryogenic engineering applications. The benefits of BOC's experience and tradition are free to customers, and experts are always available for discussion and advice—a complete service from pre-sales consultation through all stages of design and construction to after-sales advice and co-operation.

BOC MAKE

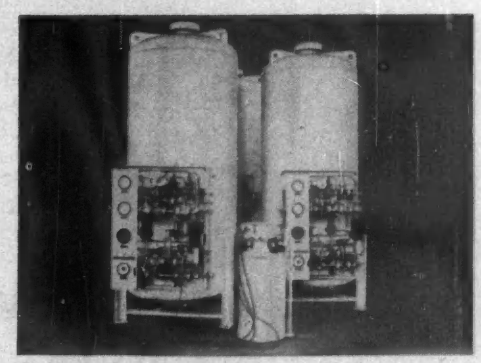
Complete Air Separation Installations for Oxygen, Nitrogen and Rare Gases
Transportable Oxygen Plants · Gas Purification Systems
Liquid Oxygen Pumps and Vaporisers · Gas Compressors
Gas and Liquefied Gas Storage Systems · Gas Separation Plants



Liquid Oxygen Plants at the Argon Purification Plant, UKAEA, Dounreay



Cross Flow Heat Exchangers



Vacuum Insulated Evaporators

For air separation plant—first consult

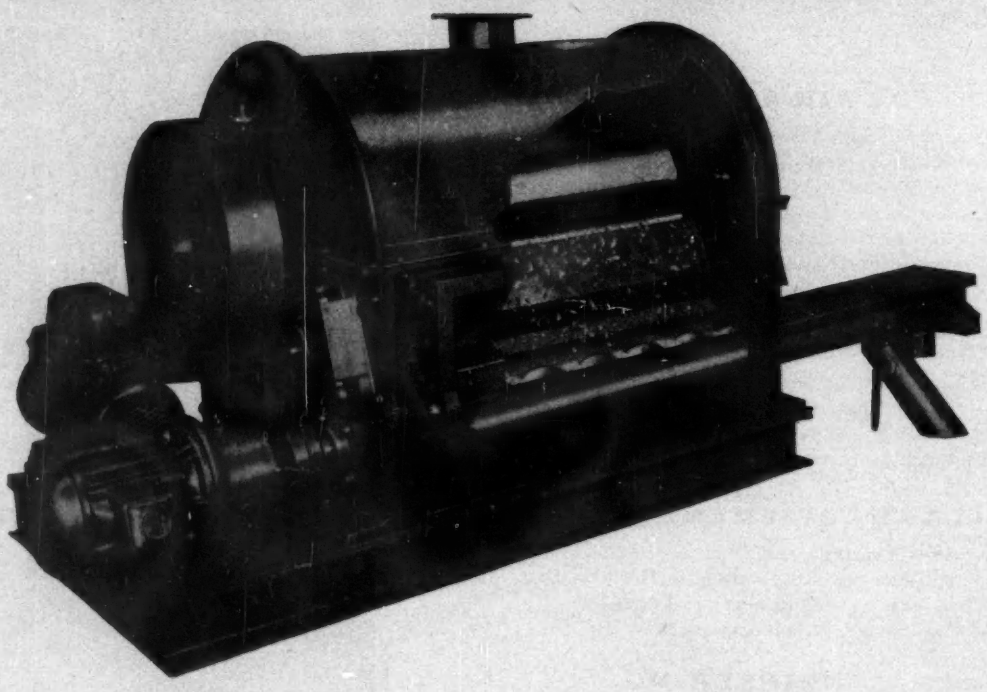
The British Oxygen Company Ltd

HEAVY INDUSTRIAL DEPARTMENT Spencer House, St. James's Place, London, SW1. HYD 3051

SIMON

PATENT

COOLING & FLAKING MACHINE



In constant production in a large number of sizes ranging from 8" dia. x 8" long to 42" dia. x 108" long. Rolls are constructed of cast iron, chromed cast iron, nickel iron, stainless steel, phosphor bronze, etc.

Machines have been supplied to leading chemical manufacturers at home and abroad for flaking such materials as naphthalene, phthalic anhydride, carbamite, stearines, waxes, etc., etc.

Test machines are available at these Works, and experiments are carried out on customers' materials without charge or engagement.

RICHARD SIMON & SONS, LTD.

PHOENIX WORKS · BASFORD · NOTTINGHAM

Telephone: 75136-7-8 Telegrams: Balance, Nottingham

SPECIALISTS IN DRYING PLANTS AND AUTOMATIC WEIGHING MACHINERY FOR OVER 60 YEARS

Serving the World's Industries

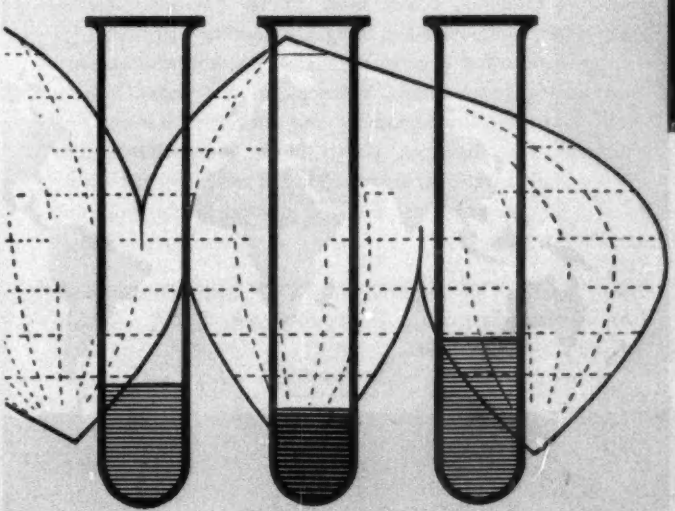
specialists in the production of

Fluorine Compounds

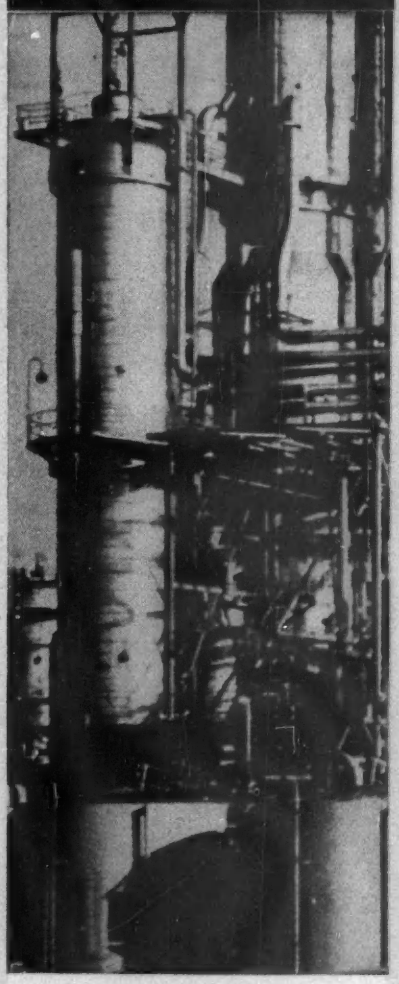
Hydrofluoric Acids

Analytical Reagent Acids

JAMES WILKINSON & SON LTD. SHEFFIELD



INDUSTRIAL WILKINSON CHEMICALS



L I L

A MEMBER OF THE LAPORTE GROUP OF COMPANIES

JAMES WILKINSON & SON LTD.
TINSLEY PARK ROAD, SHEFFIELD 9
Tel: 41208 Grams: Chemicals, Sheffield 9

LONDON AGENTS & DISTRIBUTORS
JOSEPH WEIL & SON LTD., FRIARS HOUSE,
39-41 New Broad Street, London, E.C.2

MIDLANDS AREA OFFICE,
153 Parker Drive, Leicester.
Telephone: Leicester 63861

V/O SOJUZCHIMEXPORT exports various chemical products, medicaments and medical equipment

V/O "Sojuzchimexport" exports:

Pineneedle oil, Minsk retort root pine tar, Archangel tar and other naval stores products; pyridine bases, beta-picoline fraction, coumarone resin and other coke-oven products; potassium carbonate crystals, sodium sulphide, hydrogen peroxide and other inorganic chemicals; methanol, synthetic technical camphor, oxalic acid, aniline dyestuffs, aniline, aniline salt, diphenylamine, rongalite, auxiliary products for dyestuffs and other organic chemicals; white arsenic, arsenic —containing preparations, chloropicrin and other insecticides; essential oils, perfumery and cosmetics, various fine chemicals, radio-isotopes, photo-cinema materials; medical drugs and preparations; pharmaceuticals and medicinal herbs; Tibet medicine products; modern medical instruments and equipment.

Please address all enquiries to: **V/O Sojuzchimexport Smolenskaja-Sennaja, 32/34 Moscow G-200, USSR.**
Cables: Sojuzchimexport, Moscow *Telephone:* G-4-22-84
Telex: Chimexport No. 125.

British Celanese Limited

expanding in chemicals

the many

'Celanese' chemicals

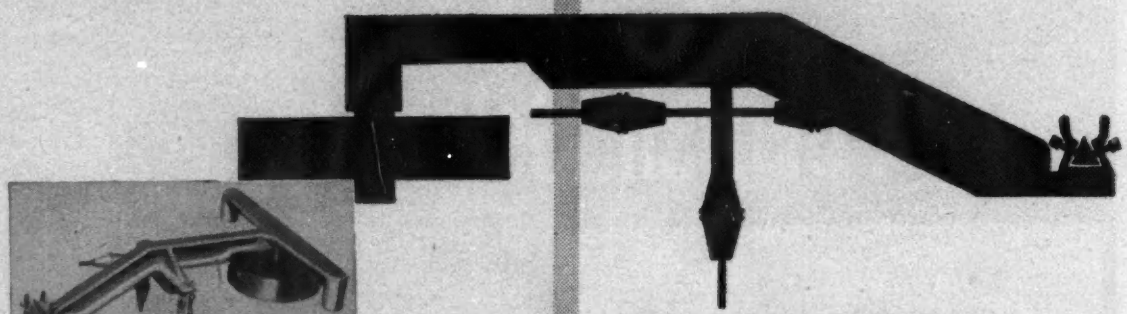
and allied products

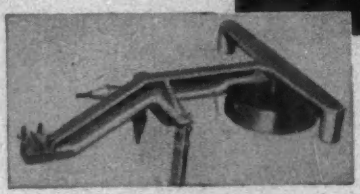
include

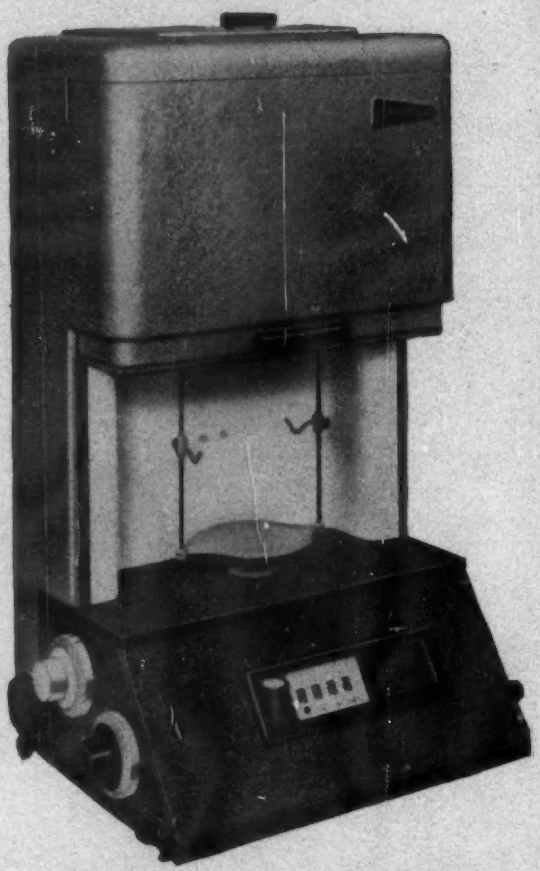
orders large or small
Celanese resources are geared to bulk shipments, but small orders receive equally prompt and careful attention

Write for information and samples to:—
Chemical Sales Department
BRITISH CELANESE LIMITED
Foleshill Road, Coventry
Telephone: 88771

B







STANTON

UNIMATIC

SINGLE PAN BALANCE

STANTON
now introduce
CONSTANT
LOAD

into the design of their UNIMATIC single pan balance. After exhaustive experiments and tests they are now able to offer the balance based upon the principle of weighing by substitution as an alternative to the already well established equal arm "Ultramatic" balance. The new Model avoids errors due to inequality of lever arms and slight variations in sensitivity due to major changes in load.

The Stanton synthetic sapphire knives and planes give longer life and the grouped controls at bench level simplify operation.

THE BEAM is pressure die-cast of a special alloy in H section and it is buoyancy corrected and stress relieved.

THE ARRESTMENT is jewelled, and based on the cone, vee and plane principle and is operated by a large diameter cam which results in safe beam release without the addition of further mechanical devices or safeguards.

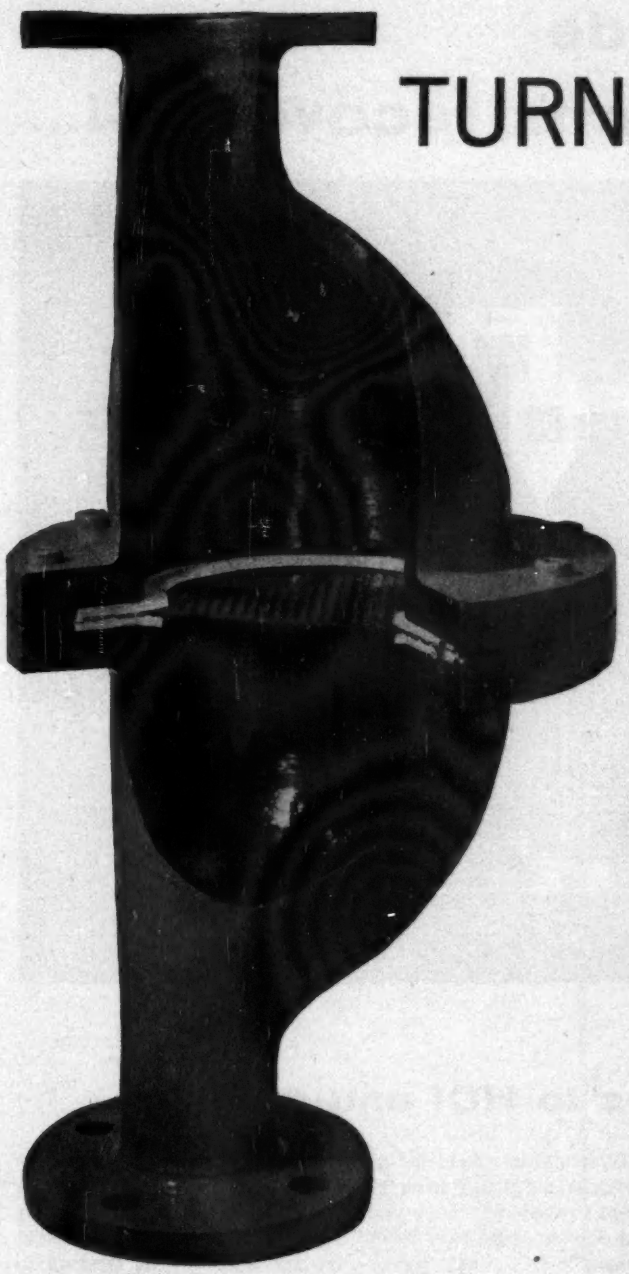
WEIGHT LOADING is to 200 g. and incorporates a taring device to 100 g. with a net range of 100 g. after taring.

CONTROLS are grouped conveniently at bench level allowing even unskilled persons to acquire speed of weighing easily and quickly.

• FAST • STEADY
• SAFE • SIMPLE

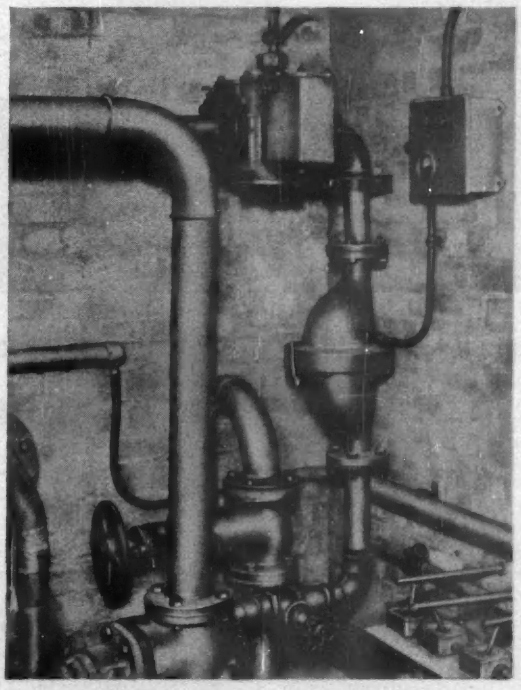
Send for this informative leaflet

STANTON INSTRUMENTS LTD
119 Oxford Street, London, W.1
Tel.: GERrard 7533



TURNING THE SCALE

The electrical water treatment pipe units, made by Aquastat Ltd and used to prevent scale, have their interior surfaces coated with Araldite. This epoxy coating resin is an excellent electrical insulator; it adheres strongly to the metal, is entirely impervious to water over very long periods, and is unaffected by chemicals found in all waters normally in use; it is also highly resistant to abrasion and scouring action. Aquastat Ltd have tested many forms of coating for their pipe units. Araldite, which has been used for the last five years, has proved the most effective and the most economical.



Araldite epoxy resins are used—

- for casting high grade solid electrical insulation
- for impregnating, potting or sealing electrical windings and components
- for producing glass fibre laminates
- for producing patterns, models, jigs and tools
- as fillers for sheet metal work
- as protective coatings for metal, wood and ceramic surfaces

Araldite epoxy resins

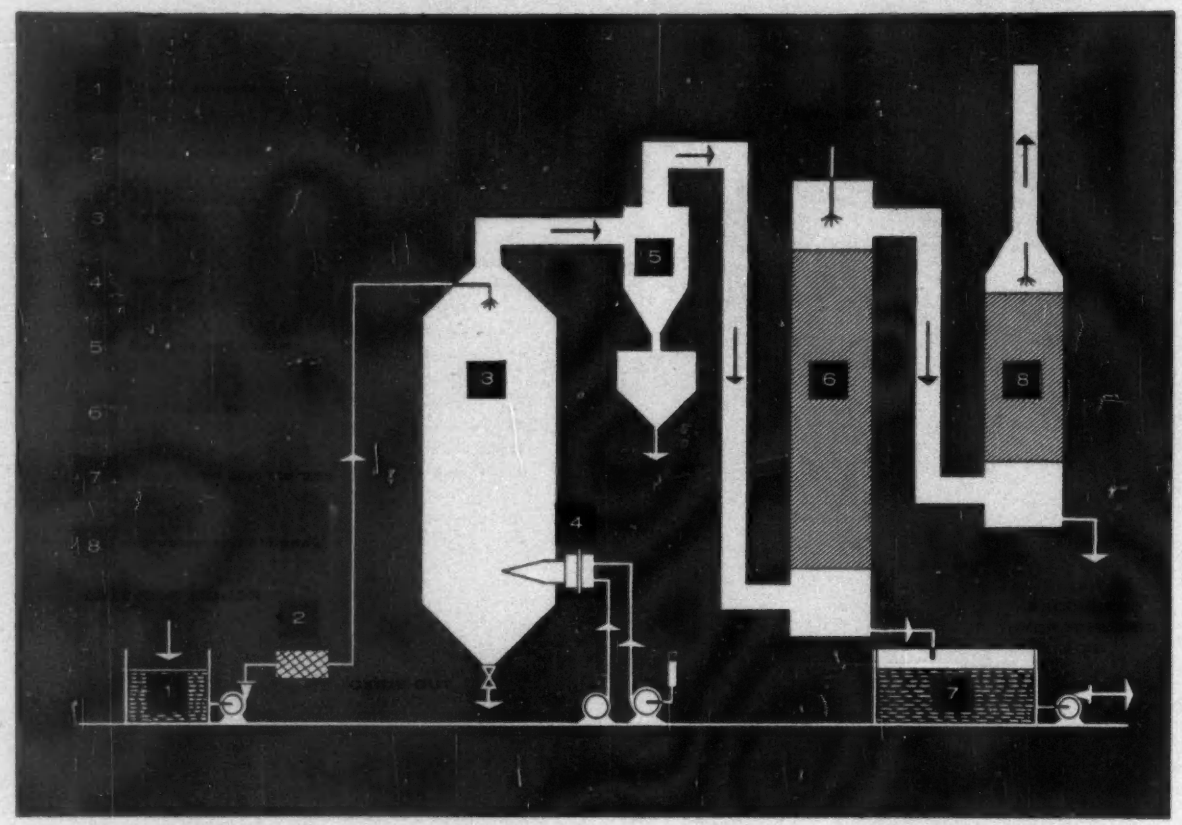
Araldite is a registered trade name

CIBA (A.R.L.) LIMITED

Duxford, Cambridge. Telephone: Sawston 2121

AP 589

Solve your chloride effluent problems, recover HCl...



the AMAN process hydrolyses chlorides to HCl and oxides

If you use Hydrochloric Acid for pickling, metal extraction or other processes giving a metal chloride liquor, then you will find that the Aman Patented Process will save you time and money. In pickling, for instance, acid consumption may be cut by over 90%. The recovered acid contains up to 33% HCl ready for re-use; dry, free-flowing iron-oxide being the by-product.

Plants may be located in the open, with coverings for burners, etc. Waste heat recovery can also be incorporated. Our technical advisory staff will supply you with all the details: a pilot plant is available to test your own liquors.

The Aman Patented Process is made under licence by

NORDAC CHEMICAL ENGINEERS

NORDAC LIMITED · UXBRIDGE · MIDDLESEX · UXBRIDGE 35131-4

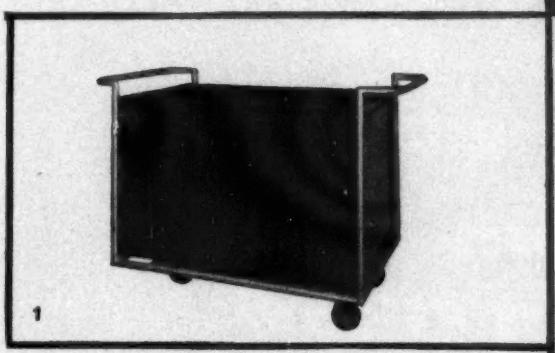
A MEMBER OF THE WOODALL-DUCKHAM GROUP OF COMPANIES

FOR INDUSTRY

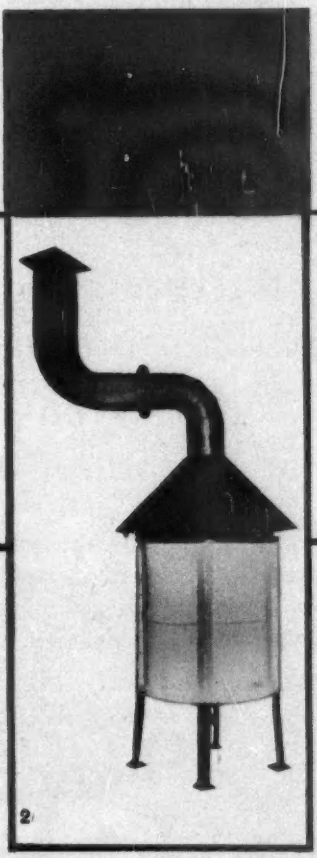
Propylex
TRADE MARK

POLYPROPYLENE SHEETING

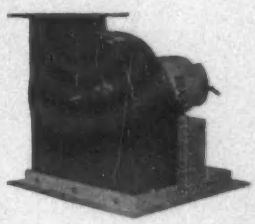
Because **Propylex** is
HEAT AND CHEMICAL RESISTANT
STERILIZABLE
LIGHT WEIGHT (specific gravity 0·91)
RESISTANT TO CRACKING
and has an
EXCELLENT SURFACE FINISH



1



2



3

AVAILABLE IN SHEET UP TO 8′ x 4′
THICKNESS ·010″ to ·180″

1. DYEHOUSE TRUCK
Manmil Plastics Limited,
Stalybridge, Cheshire.
2. PROCESS TANK
James Coates Bros. Limited,
Middleton, Lancs.
3. BOOSTER FAN
Resistant Equipment Limited,
76 Rivington Street,
London, E.C.2.

Samples and prices on application to:—

SPL 2

Plastics Division
British Celanese Limited

CELANESE HOUSE, HANOVER SQUARE, LONDON, W.1

VOLACEL

SPONGE RUBBER

DRUM SEALING RINGS

in Chemical and oil resistant Neoprene and Natural rubbers

SUPPLIED in SIZES and DENSITIES to SUIT CUSTOMERS REQUIREMENTS

Open cell (Intercommunicating) Natural or Synthetic Rubber types . . . . .

★ Closed cell (Non-intercommunicating) Natural or Synthetic Rubber types . . . . .

★ This material, because of its microporous structure of non-connected cells filled with inert gas, is highly resistant and non-absorbent. It has innumerable uses where non-absorbence of moisture is of paramount importance . . .

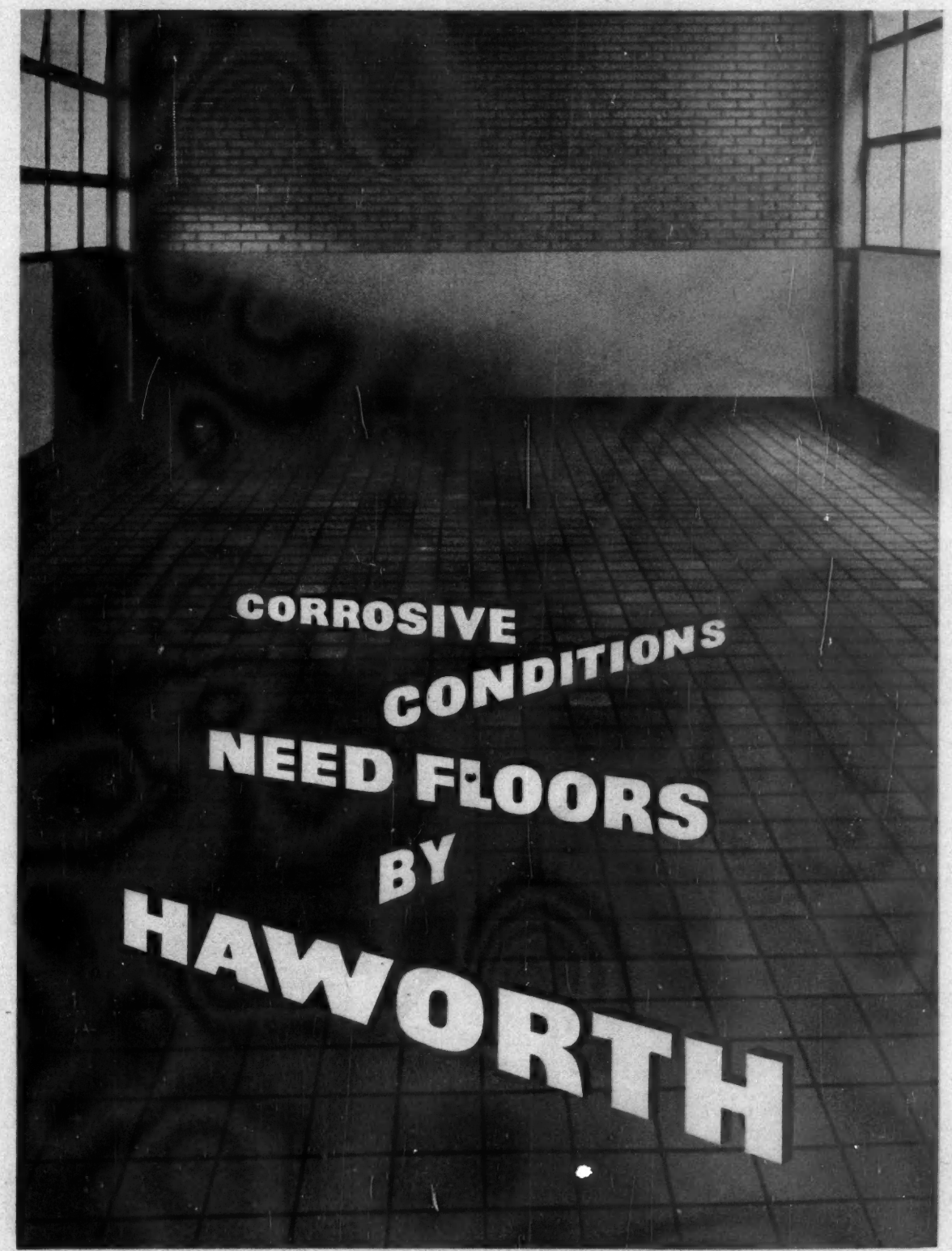
A Volcrepe PRODUCT

Also available in sheets, cut and fabricated gaskets and strips.

N.B: We invite you to take advantage of our advisory and technical service. If you have a problem concerned with the keeping in or the keeping out of liquids, powders or gases, we will most earnestly seek to supply gaskets, sealing rings, washers, strips, etc., which will efficiently and economically solve the problem.

VOLCREPE LTD. . Glossop . Derbyshire

TELEPHONE: GLOSSOP 3254/5/6/7/8



F. HAWORTH (A.R.C.) LTD.

HEAD OFFICE : IRWELL CHEMICAL WORKS - RAMSBOTTOM - MANCHESTER - Telephone : RAMSBOTTOM 2607-3079

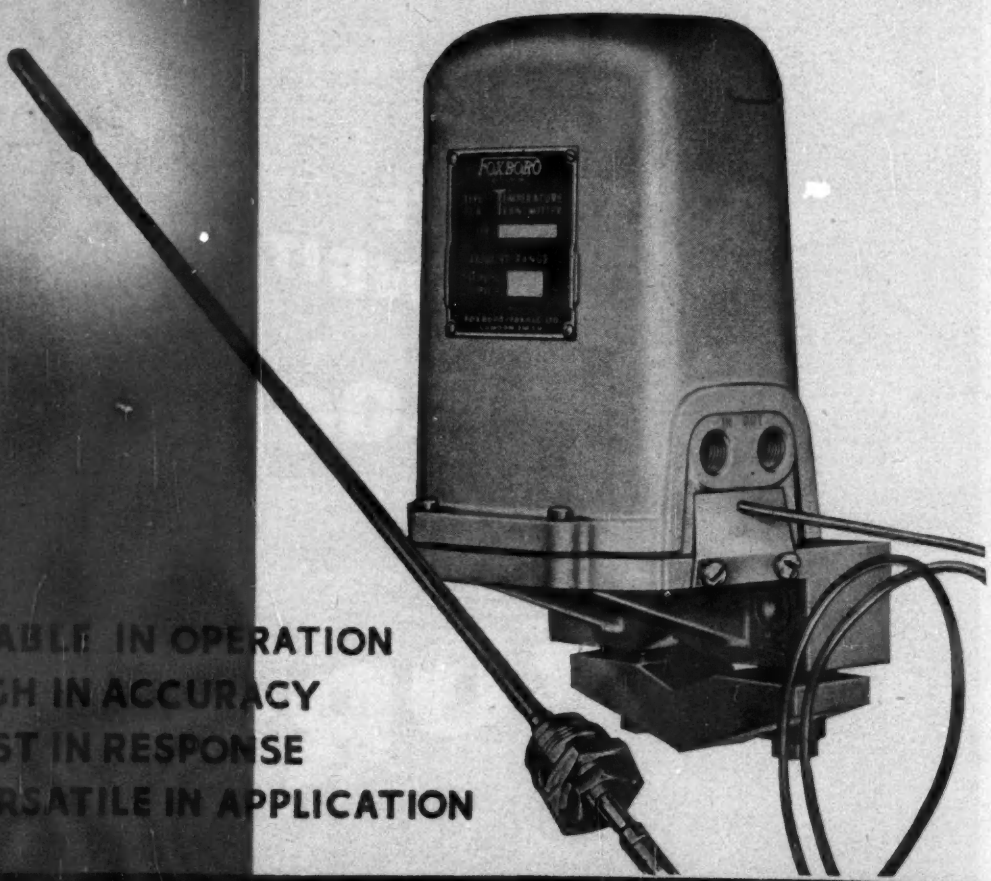
LONDON OFFICE : 40 BUCKINGHAM PALACE ROAD - LONDON S.W.1. - Telephone : TATe Gallery 3861

Better temperature measurement + transmission with the new

FOXBORO

M/12A Pneumatic

TEMPERATURE TRANSMITTER



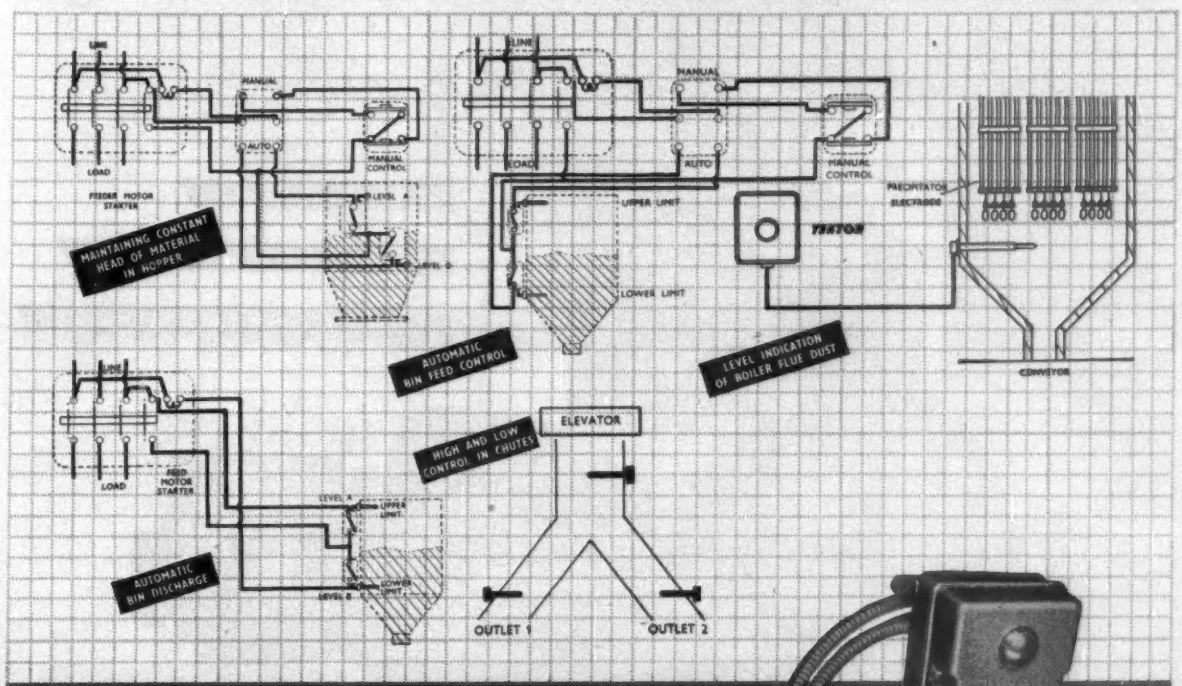
- STABLE IN OPERATION
- HIGH IN ACCURACY
- FAST IN RESPONSE
- VERSATILE IN APPLICATION

FOXBORO-YOXALL LIMITED

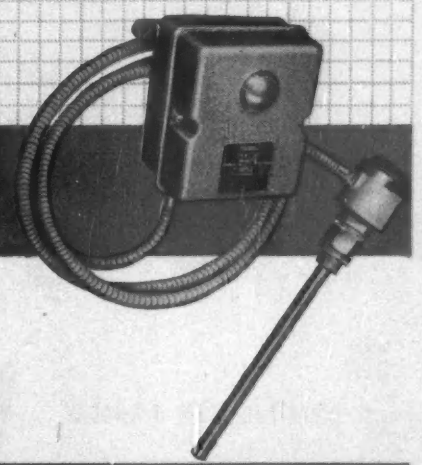
REDHILL · SURREY · ENGLAND

REDHILL 5000

level control and indication



by the Fielden CAPACITANCE METHOD



Send for details of this complete range of level indicators and recorders used throughout the world to answer almost every level problem involving any liquid or free-flowing solid regardless of conductivity, insulating value, density or corrosive properties.

- Simple to install.
- Single or multiple units for centralised indication and control.
- Up to 250 feet of cable length between controller and sensing electrode.
- No moving parts in the container.
- Over 100,000 installed throughout the world.

The range includes the famous

TEKTOR REGD. LEVEL CONTROLLER

TELSTOR REGD. LEVEL INDICATOR

SEND FOR CATALOGUE

Please send me your 12 page catalogue of instruments for level control and indication.

FIRM .....

ADDRESS .....

.....

.....

ATTENTION OF .....

.....

TTS/CA

Fielden

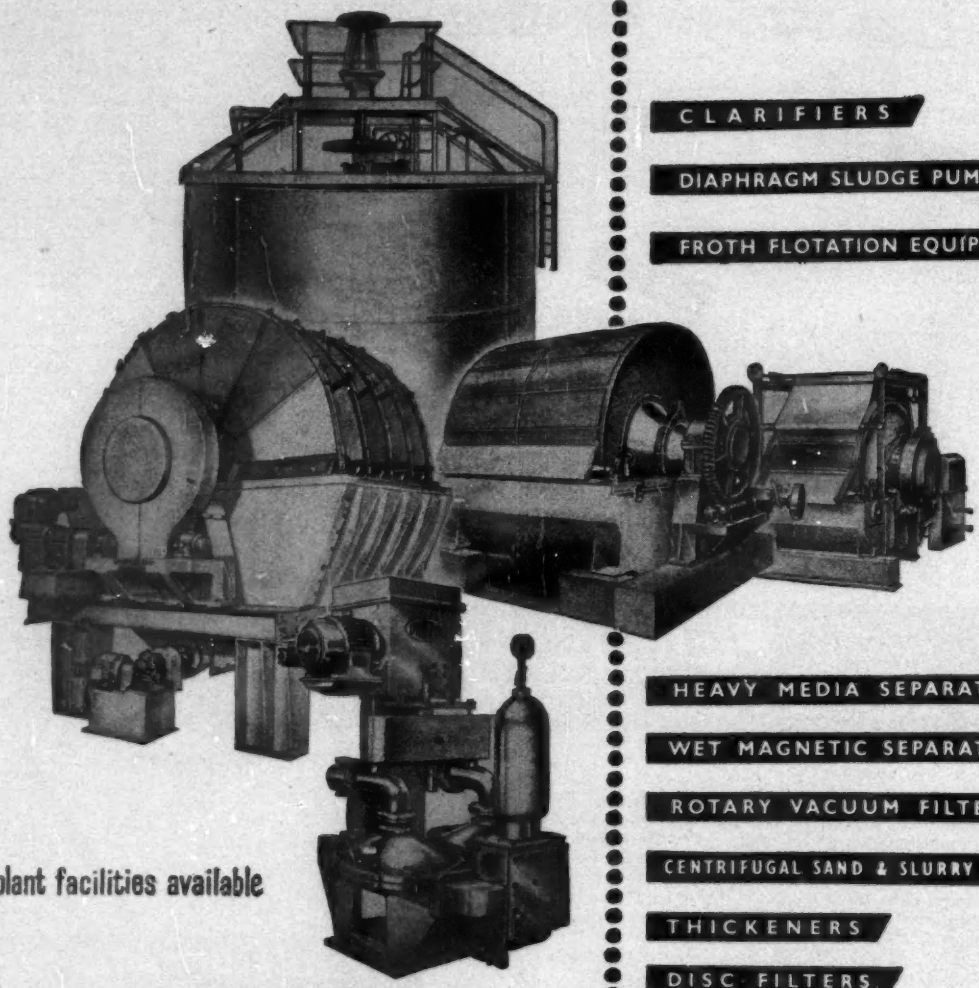
FIELDEN ELECTRONICS LTD · WYTHENSHAWE · MANCHESTER Phone: Wythenshawe 3251 (4 lines) Grams: Humidity Manchester

ALSO AUSTRALIA, ITALY AND CANADA *Branch Offices:* LONDON, WALSALL, STOCKTON-ON-TEES, EDINBURGH (A. R. BOLTON LTD) AND DUBLIN

Agents throughout the world

Indicating Recording Control

Plant for wet material handling



CLARIFIERS

DIAPHRAGM SLUDGE PUMPS

FROTH FLOTATION EQUIPMENT

HEAVY MEDIA SEPARATORS

WET MAGNETIC SEPARATORS

ROTARY VACUUM FILTERS

CENTRIFUGAL SAND & SLURRY PUMPS

THICKENERS

DISC FILTERS

Test plant facilities available

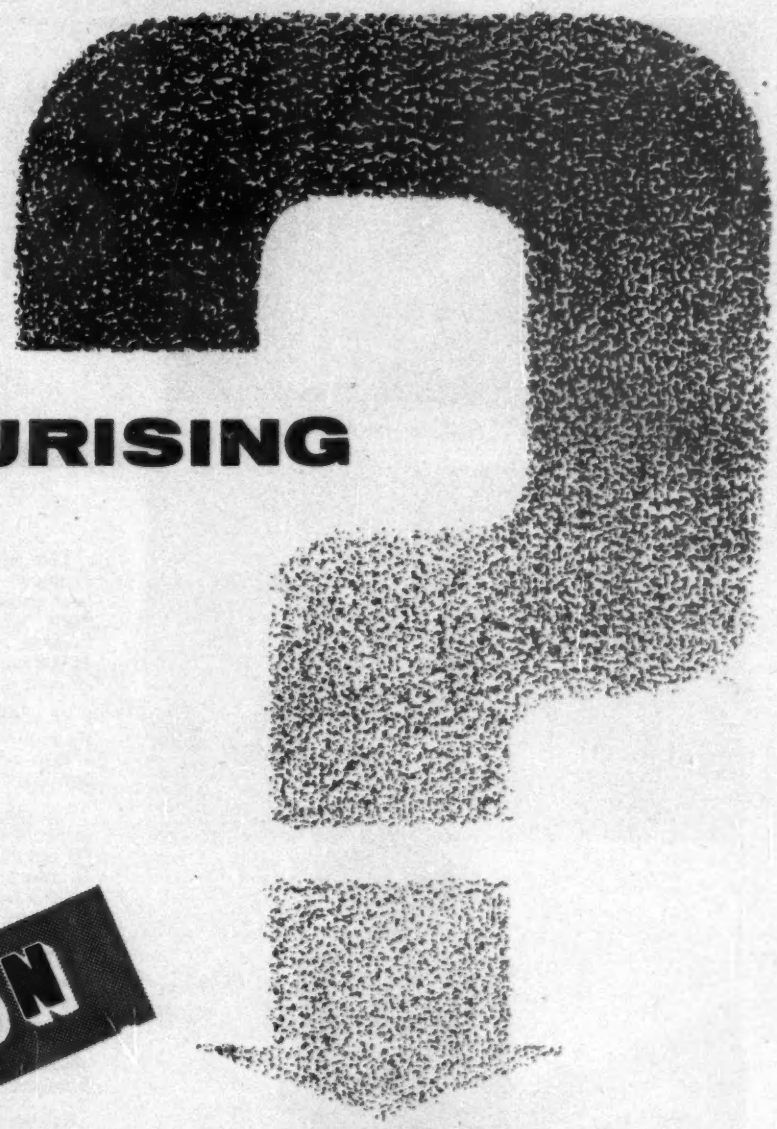
unifloc plant

UNIFLOC LIMITED, 2-3, ST. MARY STREET, SWANSEA · TELEPHONE 55164

is yours a

DECOLOURISING

problem

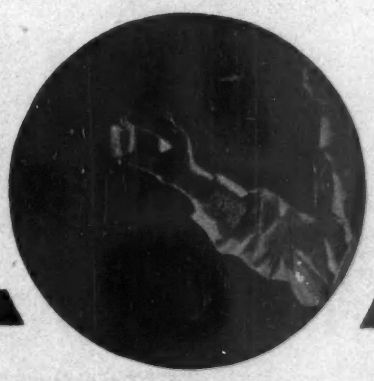


...specify

ACTIBON

THE
HIGHLY ACTIVATED
DECOLOURISING
CARBON

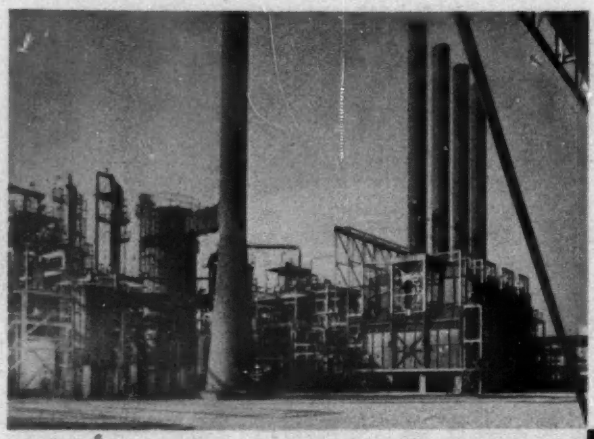
its THE
CLEAR SOLUTION



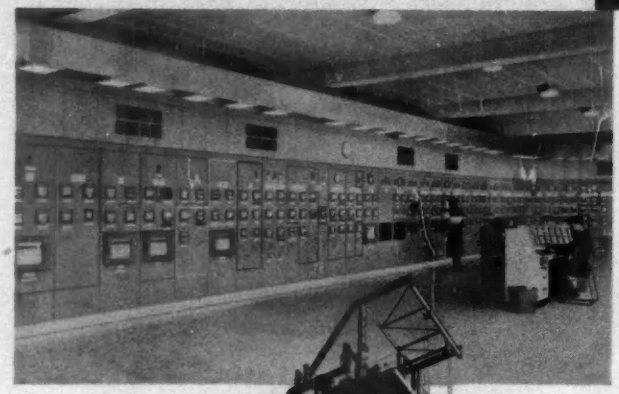
THE CLYDESDALE CHEMICAL CO., LTD.

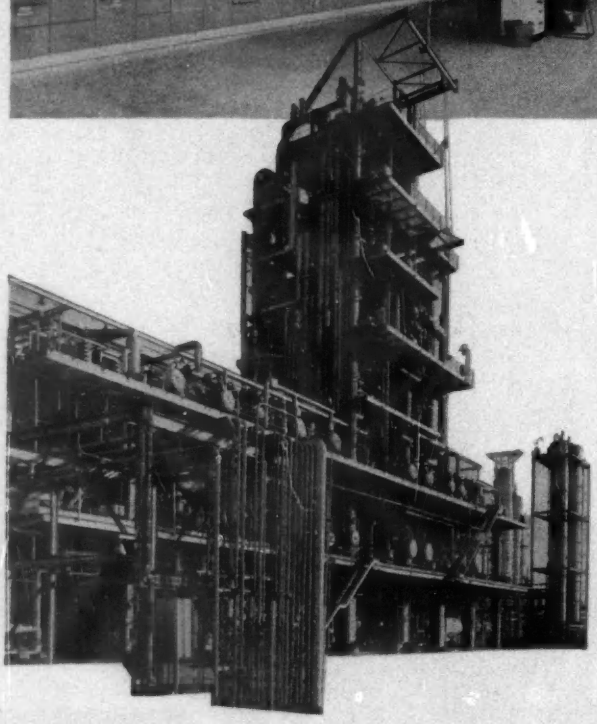
142 QUEEN STREET, GLASGOW, C.1.

Phone Central 5247-8 *Grams "Cactus" Glasgow.*



NEW SHELL CHEMICAL COMPANY ETHYLENE UNIT ON STREAM AT CARRINGTON, ENGLAND





The new Shell Chemical Company Ltd., Ethylene Unit, Carrington, England, has just been placed on stream. This unit was built for Shell by Kellogg International Corporation, London. It is designed ultimately to produce 55,000 long tons per annum of Ethylene from a straight run naphtha feed.

In addition to high purity Ethylene products, the unit produces debutanized gasoline, fuel oil, a Butadiene/Butylene product, with Propylene and Ethane, plus a refinery gas for fuel.

Naphtha is cracked in Kellogg steam cracking furnaces, using a very low steam to naphtha ratio for optimum yields at minimum operating costs. In order to increase the economy of operations, the effluent from the cracking furnaces is quenched in Dowtherm exchangers and subsequently, scrubbed with gas oil to remove entrained polymers and solids. The hot Dowtherm is utilized to generate medium pressure steam. After separation of the heavy ends, the remaining gas is subjected to water and caustic wash, drying, and acetylene removal before passing to the low temperature separation section for recovery of Ethylene and other fractions.

Refrigeration is accomplished using Ethylene and Propylene as refrigerants, three temperature levels being used in each case, the lowest level being—150°F. A further degree of cooling is obtained by utilization of the Joule-Thompson effect in the Demethanizer. An extensive heat exchange system is employed to keep the refrigeration load to a minimum and thus keep operating cost low.

The No. II Unit at Carrington is the first built for Shell by Kellogg International Corporation in the United Kingdom. Kellogg International Corporation supplied complete services covering all aspects of process design, engineering, procurement and construction, together with a team of operators for the commissioning programme.

KELLOGG

KELLOGG INTERNATIONAL CORPORATION

Kellogg House · 7-10 Chandos Street · Cavendish Square · London W.1

SOCIETE KELLOGG · *PARIS* · THE CANADIAN KELLOGG COMPANY LTD · *TORONTO*
KELLOGG PAN AMERICAN CORPORATION · *BUENOS AIRES* · COMPANHIA KELLOGG BRASILEIRA · *RIO DE JANEIRO* · COMPANIA KELLOGG DE VENEZUELA · *CARACAS*
Subsidiaries and Affiliates of THE M. W. KELLOGG COMPANY NEW YORK

METALOCK

"Metalock" is the trade mark of Metalock (Britain) for the inserts used in machinery repairs

COLD REPAIR OF CASTINGS

Used and approved by leading firms throughout the world

SUCCESSFUL REPAIRS FOR

Imperial Chemical Industries Ltd.
Iraq Petroleum Co. Ltd.
Midland Tar Distillers Ltd.
National Benzole Co. Ltd.
The South Bank Chemical Co. Ltd.
Esso Transportation Co. Ltd.

NO DISMANTLING · NO REASSEMBLING

GUARANTEED REPAIRS
CARRIED OUT ON SITE

BRITISH DEPOTS

BIRMINGHAM	*Bearwood* 2799	LIVERPOOL	*Central* 3820
BRISTOL	*Bristol* 56014	NEWCASTLE	*Newcastle* 24808
CARDIFF	*Cardiff* 29719	SHEFFIELD	*Sheffield* 29361
GLASGOW	*City* 7203	W. CUMBERLAND	*Egremont* 381

METALOCK (BRITAIN) LIMITED

GRAND BUILDINGS · TRAFALGAR SQUARE · LONDON, W.C.2.

Telephone: Whitehall 8902/5 Cables: Metlokcast, Rand, London

Ask Berk

for

Chemicals and Acids
Raw Drugs and Botanicals
Metal Powders and Mercury
Filteraids and Special Clays
Insecticides and Fungicides
Drying and Micronizing Plant
Metal and Plastic Coatings

F. W. BERK & Co., Ltd.

Berk House, 8 Baker Street, London, W.1
Telephone: HUNter 6688
MANCHESTER · GLASGOW · BELFAST · SWANSEA

3-stage Compressor, 4,500 cfm to 400 psi on Works Test

B & M

COMPRESSORS

AIR & GAS — HIGH & LOW PRESSURE

Reciprocating and Rotary Types

Reciprocating Compressors
500 to 6,000 cfm to 120 p.s.i.g

High Pressure Compressors
up to 50,000 p.s.i.g

Rotary Compressors
100 to 1,000 cfm to 110 p.s.i.g

Belliss & Morcom are prepared to design and build COMPRESSORS and VACUUM PUMPS for special purposes, also to manufacture any other type of plant to YOUR OWN DESIGNS.

"HAVE IT BELLISS BUILT"

Steam Turbines · Compressors · Vacuum Pumps
Steam Engines · Diesel and Dual Fuel Engines
Condensing Plants · 'ARCA' Automatic Regulators.

Belliss & Morcom Ltd

BIRMINGHAM 16 ENGLAND

London Office: 25 Victoria Street, S.W.1.

WARD-BUILT SIDINGS

for Iron & Steelworks

The planning, estimating, building and maintaining of industrial sidings anywhere in the British Isles are all part of the service offered by Rail Department. Two booklets: 'Rails and Rail Accessories', and 'Railway Sidings by Wards', are available on request. (Photograph taken at Round Oak Steelworks, Brierley Hill, Staffs, and published by kind permission.)

THOS. W. WARD LTD | ALBION WORKS · SHEFFIELD
Telephone: 26311 · Telex: 54-119

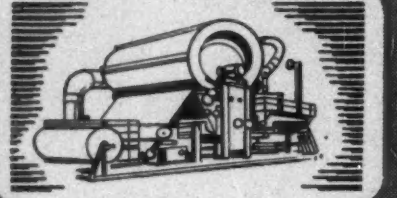
LONDON OFFICE: BRETTENHAM HOUSE · LANCASTER PLACE · STRAND · W.C.2. Telephone: Temple Bar 1515

SC.68

THE ALUMINA Co. Ltd.

MANUFACTURERS OF ALUMINIUM SULPHATE

FOR

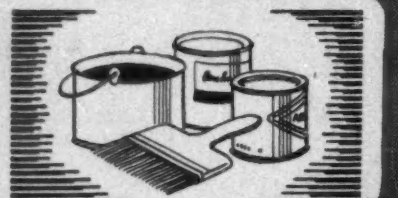


PAPER MAKING

FOR

WATER PURIFICATION

FOR

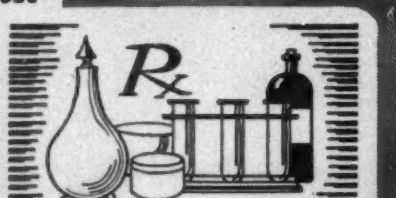


COLOUR MAKING

FOR

EFFLUENT TREATMENT

FOR



PHARMACEUTICALS

FOR

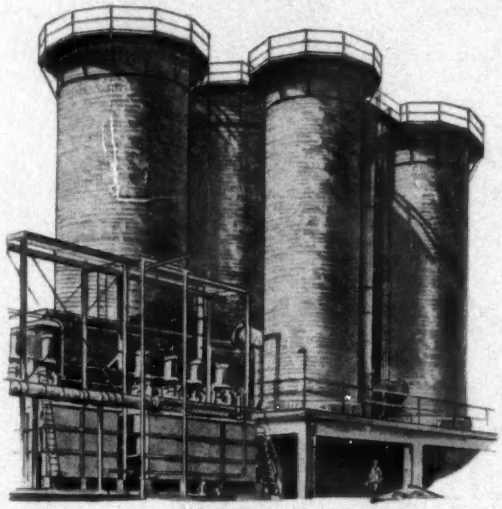
HORTICULTURE

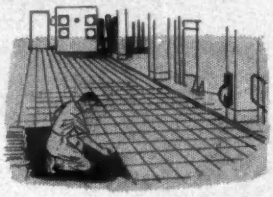
The above are but a few of the main uses of ALUMINIUM SULPHATE

We should be pleased to supply further details on request

IRON BRIDGE WORKS · WIDNES

LANCASHIRE **Telephone: WIDNES 2275**



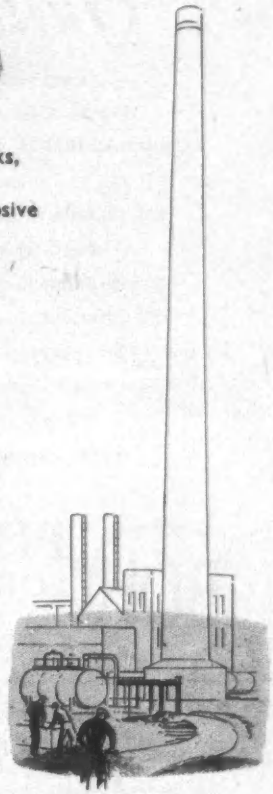


* WE CONSTRUCT

We construct and line Absorption Towers of various types, Process Tanks, Reaction Vessels, Dye Vats and Storage Tanks. In fact wherever corrosive liquids or gases are handled we can offer the right type of lining.

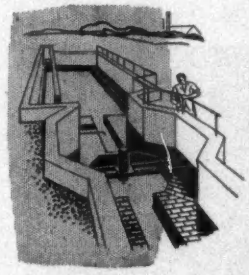
* WE DESIGN

We design Plants for the treatment and disposal of waste chemical effluent and chemical drainage layouts.



* WE SUPPLY AND INSTAL

We supply and instal floors for all Processing Industries, including Metal Finishing, Man Made Fibre and Textile, Fertiliser, Petrochemical, Steel, Heavy Chemical, Pharmaceutical, Gas and Electrical. We also supply Anti-Corrosive materials for our Clients' own use.



* WE ADVISE

We advise Clients who require information about suitable protective linings for their Plant and Floors.

* Ancorite

— Sure protection from chemical attack

ANCORITE LIMITED

2-4 LADBROOK ROAD · SOUTH NORWOOD · LONDON S.E.25 · *Phone: LIVingstone 6616*

For more information use Enquiry Form—**CP Ref. 3728.**

C

Quite Outstanding

Pure and very pure hydrofluoric acid and pure and very pure fluorides are quite outstanding examples of B.D.H. Fine Chemicals for Industry. Fluorides for special fluxes, fluorides for optical pieces and crystals, magnesium fluoride for coating lenses—at one time a British Admiralty secret and now a process adopted by leading manufacturers of cameras, binoculars and other instruments in all countries—and fluorides for many other purposes are becoming so important that they may be called a major B.D.H. interest. You may, if you are interested, buy them in laboratory or even super-laboratory quality by the ton.

BDH

FINE CHEMICALS
FOR INDUSTRIAL USE

THE BRITISH DRUG HOUSES LTD · POOLE · DORSET
B.D.H. LABORATORY CHEMICALS DIVISION

Compressors for Industrial Gases

Moderate speed compressors carefully designed for reliability, are available in both vertical and horizontal arrangement from small capacities up to units of over 5,000 H.P. and very high pressures.

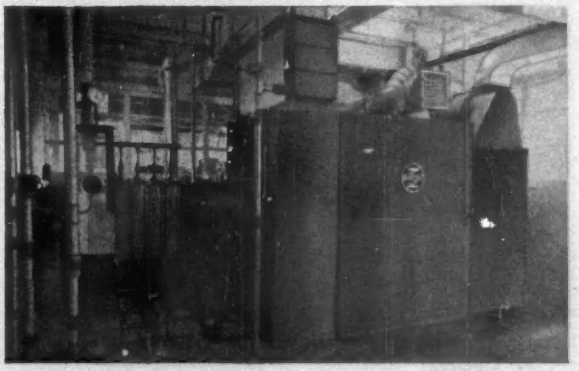
The illustration shows two vertical, three crank, six stage compressors each with a capacity of 3,000 cu. ft. per minute and a delivery pressure of 326 atmospheres.

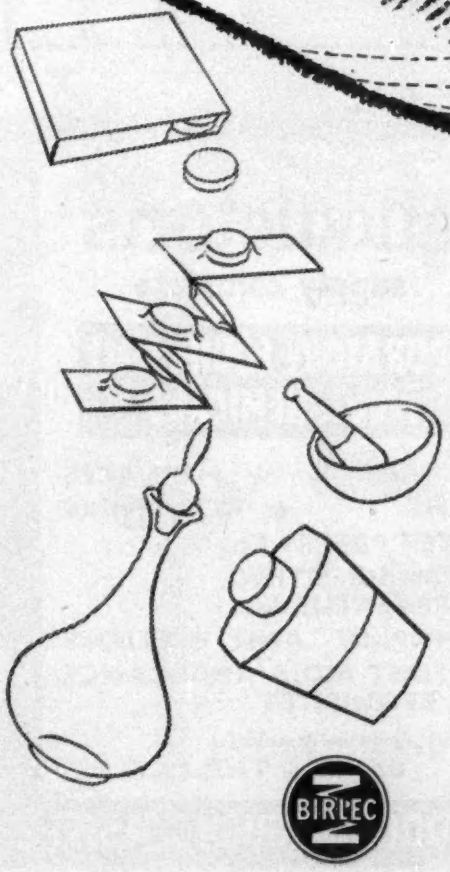
Maschinenfabrik Esslingen Germany

LLOYD & ROSS LTD
58 VICTORIA STREET S.W.1
TELEPHONE: VICTORIA 4873

DRY HYGROSCOPICS

Model CO Dehumidifier installation at Reckitt & Sons Limited, Hull, for their Steradent process room.





Many chemicals and pharmaceutical products are harmed by atmospheric moisture. Damp weather may spoil both the product and the smooth flow of the production processes if atmospheric humidity throughout the plant is not controlled. Birlec Direct Dehumidifiers offer a simple and highly efficient means of holding the relative humidity of a process room or storage enclosure at a safe low level.

AEI-Birlec Limited

Tyburn Road · Erdington · Birmingham 24

Telephone: East 1544 *Telex No: 33471*

LONDON · SHEFFIELD · NEWCASTLE-ON-TYNE · GLASGOW · CARDIFF

SM/B6231

K & K LABORATORIES, INC.

Manufacturing Chemists

Wishes to announce the availability of Bulk quantities of

ortho-NITROBIPHENYL

and

ortho-AMINOBIPHENYL

A versatile Pharmaceutical & Chemical Intermediate

Write for free catalog No. 3 listing over 12,000

RARE & FINE ORGANICS

K & K LABORATORIES, INC.
177-10 93 Ave.
Jamaica 33, New York, U.S.A.

Middletons

supply complete

LABORATORY EQUIPMENT AND CHEMICALS

★ BALANCES ★ FURNACES
★ OVENS ★ GLASSWARE
★ FILTER PAPERS Etc.
★ E-MIL SCIENTIFIC APPARATUS Etc.
★ HOPKIN AND WILLIAMS
★ FIRST AID & AMBULANCE REQUISITES

Agents and Stockists for
BAIRD & TATLOCK

MIDDLETON & CO. LTD. P.O. BOX 27 MIDDLESBROUGH Tel. 45191-2

Conquest of space!

with

ALLIS-CHALMERS

Gyratory Screens

A-C ALLIS CHALMERS

ALLIS-CHALMERS GREAT BRITAIN LIMITED

Dept. CA, 728 Salisbury House, London Wall, London, E.C.2

CPM/9AC1/3

ULTRASORB
ACTIVATED CARBONS

are available for the recovery of most industrial solvents, benzole extraction, water purification and other gas and liquid phase applications

Full details will gladly be supplied by

BRITISH CARBO NORIT UNION LIMITED
LONDON ROAD, WEST THURROCK, GRAYS, ESSEX

Cables: 'BRICARBUN GRAYS' *Telephone: GRAYS THURROCK 4845*

CARBO-UNION-WHESSOE *Activated Carbon Recovery Plant for the purification of gases and the recovery of vapour phase solvents*

WHESSOE LTD. DARLINGTON CO. DURHAM *Cables: WHESSOE DARLINGTON Tel: DARLINGTON 68681*
London Office: VICTORIA STREET, S.W.1 *Tel: ABBEY 3881*

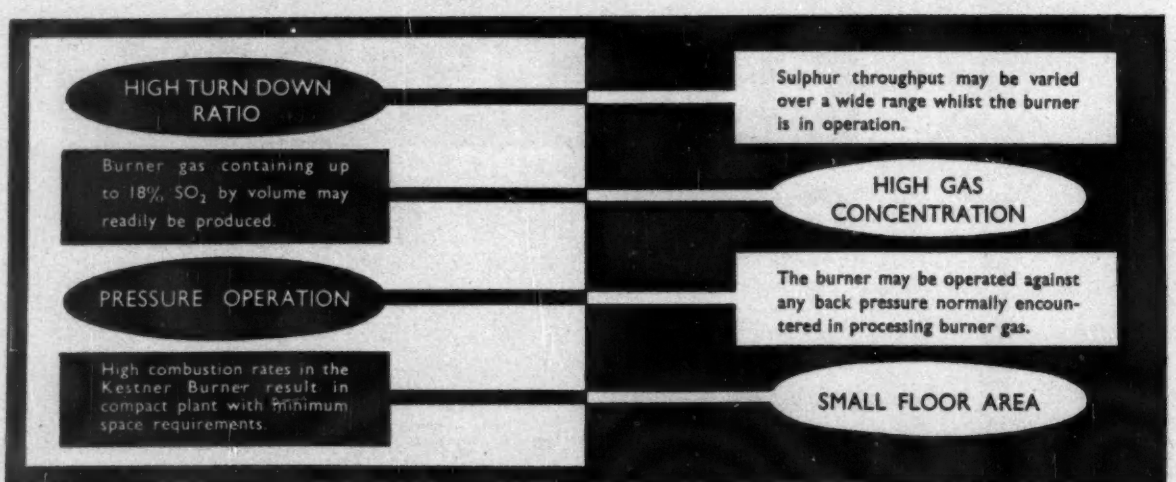
KESTNER PATENT SPRAY TYPE SULPHUR BURNER

A completely new system of burning sulphur developed by Kestners consists essentially of a specially designed atomiser and combustion chamber. Molten sulphur is sprayed into the chamber by means of heated primary air, while secondary or combustion air is introduced at high velocity through a series of nozzles situated around the periphery of the chamber. The highly turbulent conditions produced, coupled with fine sub-division of the sulphur, result in exceptionally high combustion rates and SO_2 concentration.

STANDARD SIZES AVAILABLE

Size 1—1 cwt./hour Sulphur
Size 2—2 cwt./hour Sulphur
Size 3—4 cwt./hour Sulphur
Size 4—8 cwt./hour Sulphur
Size 5—12 cwt./hour Sulphur
Size 6—16 cwt./hour Sulphur
Size 7—1 ton/hour Sulphur

Larger units are also available up to any required capacity

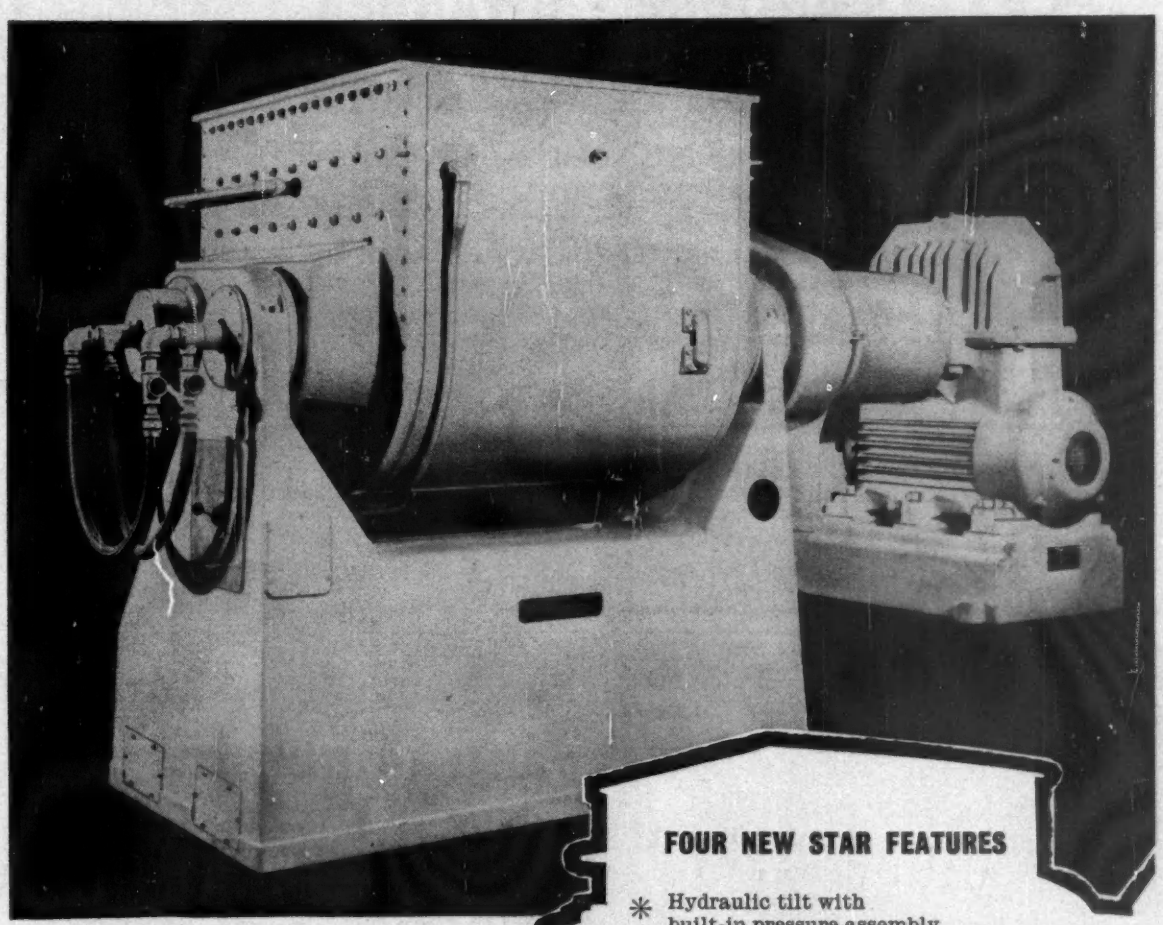

HIGH TURN DOWN RATIO
Sulphur throughput may be varied over a wide range whilst the burner is in operation.
Burner gas containing up to 18% SO_2 by volume may readily be produced.
HIGH GAS CONCENTRATION
PRESSURE OPERATION
The burner may be operated against any back pressure normally encountered in processing burner gas.
High combustion rates in the Kestner Burner result in compact plant with minimum space requirements.
SMALL FLOOR AREA

KESTNER EVAPORATOR & ENGINEERING CO. LTD., 5 GROSVENOR GARDENS, S.W.1

A 250 GALLON CAPACITY

UNIVERSAL MIXER

TO A *New* DESIGN



FOUR NEW STAR FEATURES

- Hydraulic tilt with built-in pressure assembly
- Improved gland accessibility
- Anti-friction bearings throughout
- Built-in controls

Plus functional modern styling

One of a range of machines produced in many standard sizes from 2 pints to 250 gallons. There are several basic designs available, including mixers with bottom discharge, and machines are made for a variety of power input ratings. For details, advice and assistance on all aspects of industrial mixing, write to:

Baker Perkins Ltd. ENGINEERS

Westwood Works . Peterborough

BP/CM3

T. DRYDEN LTD.

THE SOUTH WALES LABORATORY FURNISHERS

LANDORE - SWANSEA

ACIDS and CHEMICALS for SCIENTIFIC and INDUSTRIAL PURPOSES

SCIENTIFIC GLASSWARE and APPARATUS
BALANCES, MICROSCOPES, etc.

"ANALAR" CHEMICALS and ACIDS

"E-MIL" VOLUMETRIC GLASSWARE and THERMOMETERS

HIGH CLASS LABORATORY FURNITURE

PHOTOGRAPHIC CHEMICALS and EQUIPMENT

TELEPHONE - - - - - - - - - SWANSEA 55844/5

Proof against and impervious to Acids and Alkalis

Protective clothing adequately ventilated

Garments made to customers specification

Long coats, boiler suits, overalls and any other form of garment can be made up from these two specially developed fabrics. Prices are most reasonable, for instance: men's bib aprons, size 36"×42", 18s. 4d. each. Weight approximately 5 oz. sq. yd. Samples and full details will be sent by return—just fill in the coupon below.

PROOFED NYLON

Nylon is resistant to all alkalis, also to some mild acids. The natural resistance of Nylon to alkalis and its exceptional hard wearing characteristics have made it increasingly popular for industrial clothing. Where heavy splashing is encountered, however, there has been some seepage through the weave on to the wearer's clothing, but this has now been overcome by a new method of proofing which not only increases the alkali resistance, but also makes it completely impervious to liquids, even under pressure.

PROOFED TERYLENE

Terylene is resistant to most commercial acids and, again the special proofing prevents any liquids passing through it.

Not only against corrosive liquids are proofed nylon and terylene most useful, they are also admirable for those on outside work in bad weather, particularly where bulky clothing is inconvenient or unsafe.

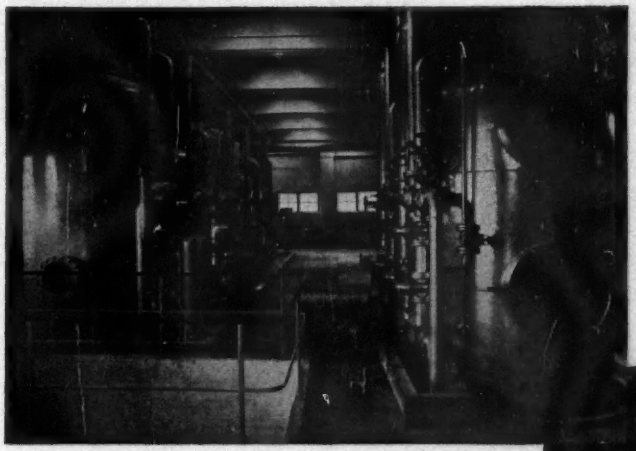
Another development by

HEAFIELD INDUSTRIES LIMITED
SPA LANE, DERBY Tel: 40358/9
SPECIALISTS IN PROTECTIVE CLOTHING

Please send me/us full details of proofed Nylon and Terylene garments/aprons
NAME .....
ADDRESS .....
.....

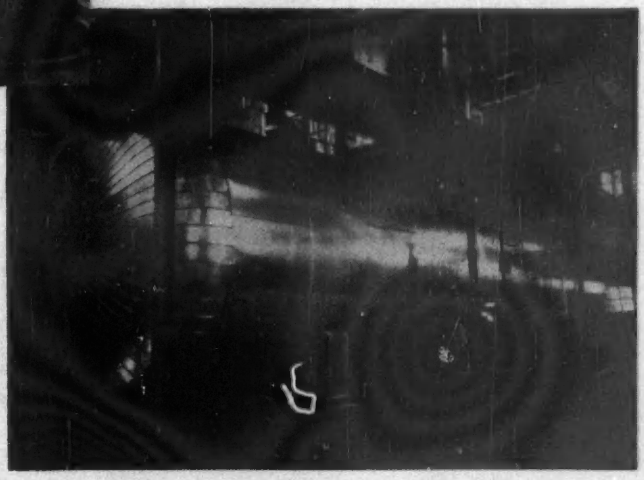
WATER TREATMENT IN FINLAND

Complete boiler-feed water-treatment plant for the new Veitsiluoto O/Y Paper Mills, Finland. Boiler pressure 1,750 psi, 42% make-up



Demineralisation Plant for Boiler feed make-up, capacity 13,400 g.p.h. and base-exchange softener for condensate returns, capacity 18,000 g.p.h.

One of seven similar "Boby" installations in Finland treating highly organic lake-water for boiler feed purposes.
All plant made in Finland to the designs of William Boby & Co.



Deaeration Plant, capacity 250,000 p.p.h. with 30 minutes storage.

WATER BOBY TREATMENT

Established in 1875

William Boby & Co. Ltd.

RICKMANSWORTH, HERTFORDSHIRE, ENGLAND. Tel: Rickmansworth 4251

CIECH POLAND

Office No. 2400—Export and Import of Organic products and Fine chemicals

recommends

HIDE GLUE IN PEARLS

(viscosity in Engler degrees at the temperature of 40°C=3-4°)

for the furniture, textile and paper industries.

BONE GLUE IN PEARLS

(specially demanded by the furniture makers; indispensable in every home for the "do-it-yourself" purposes.)

Please get in touch with our representative:

Messrs.

ANGLO-DAL LIMITED

New Oxford House
Bloomsbury Way
London W.C.1

Ciech

IMPORT AND EXPORT OF CHEMICALS, Ltd.

Poland, Warszawa 10, P.O.B. 343, Jasna 12
Cables: Ciech Warszawa

THE BEGINNING OF THE END-product

WHY PURE WATER?

For most modern industrial processes 'raw' water is quite useless. Correct water treatment is, therefore, a fundamental necessity where steam generation is the beginning of the end-product.

When the skill and knowledge of the water treatment specialist must be sought, Neckar are the people to contact.

We have the 'know-how' on the newest and most improved water purification methods, and supply plant for the following:

- All systems of Deionisation
- Base Exchange Softening
- Hot and Cold Process Lime and Soda Softening
- Accelerated Decarbonisation
- Vacuum and Pressure De-aeration
- Pressure and Gravity Filtration

also ancillary plant for:

- Fully Automatic Control of Deionisation and Base Exchange Softening
- Feed Water and Boiler Water Conditioning
- Control of Boiler Water by Continuous Blowdown with Heat Recovery
- Automatic Detection of hardness in Base Exchange Softening
- Double-seated Float Valves for horizontal and vertical installation

NECKAR

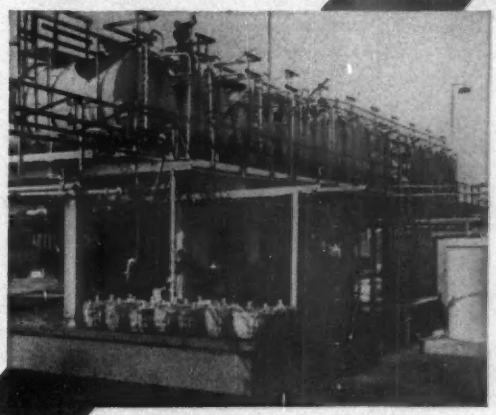
NECKAR WATER SOFTENER COMPANY LTD
Artillery House, Artillery Row, London, S.W.1
Telephone: Abbey 6552 Telegrams: Neckarist, Sowest, London

Corrosion beaten...

by pipe made with

GEON RA 170

Year by year, corrosive chemicals bite deep into metal pipe however protected and into maintenance budgets whatever their size. That this problem can now be beaten was shown most recently on the plant of Murgatroyd's Salt & Chemical Co. Ltd., Sandbach, Cheshire. By installing pipe made with Geon RA.170 PVC to carry sodium hypochlorite and hydrochloric acid they have ensured complete freedom from corrosion. Geon PVC is resistant to many corrosive fluids that can quickly destroy metal pipe—and is not attacked by acid soils. Pipe made with this outstanding material combines high tensile strength with lightness; ease of installation with economy of maintenance. It is a perfect low-cost answer to one of today's most gnawing problems.



photographs by courtesy of B T R Industries Ltd.

Geon is a reg'd trade mark

For full information about Geon RA. 170 PVC please write for Booklet No. G16/178

British Geon Ltd A COMPANY IN THE DISTILLERS PLASTICS GROUP

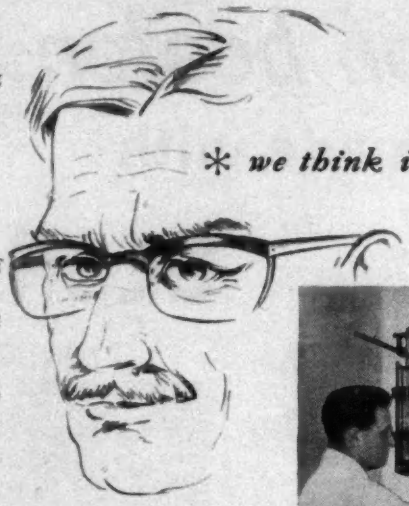
Geon

SALES AND TECHNICAL SERVICE DEVONSHIRE HOUSE PICCADILLY LONDON W1 HYDE PARK 7321

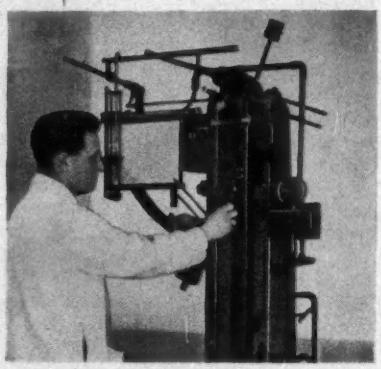
Distillers Plastics Serve Everyman

Our research teams are forever providing improved types of well-known Aeroquip hose lines, with detachable, re-usable fittings.

The latest development concerns the installation of our own plant for the production of P.T.F.E. (Polytetrafluoro-ethylene) extrusion for the inner linings of Aeroquip P.T.F.E. Hose. This means we shall be able to produce more hose, more quickly for all applications where resistance to high temperatures, and high pressures; and chemical inertness to acids, oils and corrosives are essential qualities required in hose lines.

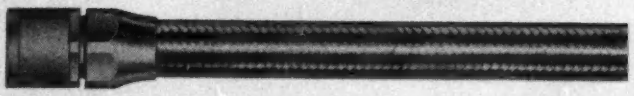


** we think in terms of tomorrow*



** Write for full technical details of the Aeroquip range of P.T.F.E. hose to:—*

Aeroquip

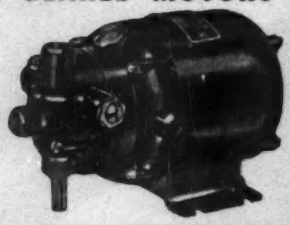


SUPER OIL SEALS & GASKETS LTD • FACTORY CENTRE • BIRMINGHAM 30 Telephone: KINGS NORTON 2041

Citenco

WORLD FAMOUS FRACTIONAL HORSE-POWER GEARED MOTORS

Output-shaft has 12 positions.
Integral Wormgear Reduction.
Ventilated—Drip Proof.
Vacuum Impregnated Windings.
Dynamically balanced Armatures and Rotors.



SERIES WOUND GEARED MOTOR—Type 'K'

R.P.M.	TORQUE	R.P.M.	TORQUE
600	10 oz. in.	37.5	4 lb. in.
300	16 oz. in.	25	4 lb. in.
150	24 oz. in.	18.8	4 lb. in.
100	32 oz. in.	12.5	4 lb. in.
75	36 oz. in.	9.4	4 lb. in.
50	3 lb. in.	6.25	4 lb. in.

SHADED-POLE INDUCTION GEARED MOTOR—Type 'FA'

R.P.M.	TORQUE	R.P.M.	TORQUE
216	4 oz. in.	13.5	24 oz. in.
108	7 oz. in.	9	30 oz. in.
54	10 oz. in.	6.7	35 oz. in.
36	12 oz. in.	4.6	44 oz. in.
27	15 oz. in.	3.35	3 lb. in.
18	20 oz. in.	2.25	4 lb. in.

VARIABLE SPEED GEARED MOTOR—Type 'KQ'

R.P.M.	TORQUE	R.P.M.	TORQUE
200-600	9 oz. in.	12-37.5	4 lb. in.
100-300	16 oz. in.	8-22	4 lb. in.
50-150	20 oz. in.	6-16.5	4 lb. in.
32-100	32 oz. in.	4-11	4 lb. in.
25- 75	40 oz. in.	3- 8.25	4 lb. in.
16- 50	48 oz. in.	2- 5.5	4 lb. in.

CAPACITOR INDUCTION GEARED MOTOR—Type 'N'

R.P.M.	TORQUE	R.P.M.	TORQUE
456	8 oz. in.	28.5	3 lb. in.
228	13 oz. in.	19	4 lb. in.
114	21 oz. in.	14.2	4 lb. in.
76	26 oz. in.	9.5	4 lb. in.
57	32 oz. in.	7.1	4 lb. in.
38	44 oz. in.	4.75	4 lb. in.

(Dept. CA58) CITENCO LIMITED
MANOR WAY · BOREHAM WOOD · HERTS · ENGLAND
Telegrams: Citenco Borehamwood. *Telephone*: Elstree 3666-7-8

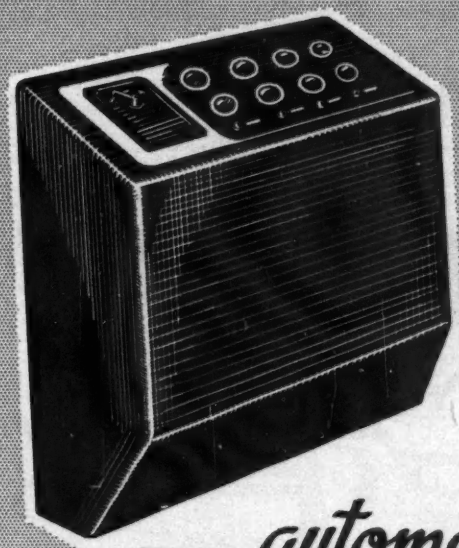
WM FLOWLINE VALVES

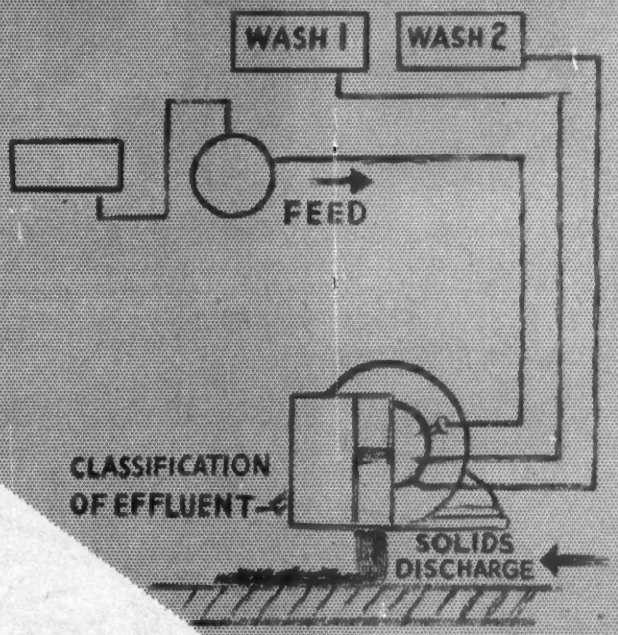
FLOW CONTROL PINCH VALVES

A new range of pinch valves for automatic or remote operation designed for use in conjunction with standard or special control gear. This valve combines the naturally good flow characteristics of a pinch valve with good response characteristics when used in conjunction with standard instruments; whilst not quite linear the response is markedly superior to other designs of pinch or diaphragm valves. If you prefer electric operation, we can provide it.

WARREN-MORRISON LTD

41 ST JAMES'S PLACE, LONDON, S.W.1. MAYFAIR. 9895

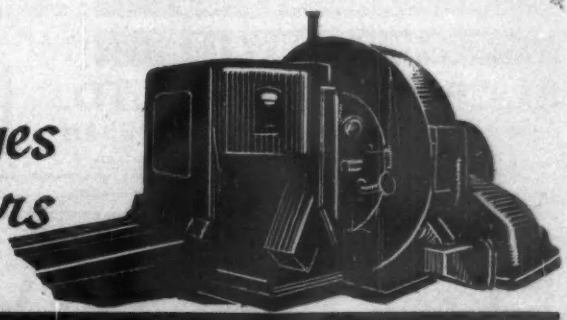




— automatics

Broadbent's can supply a proved system of automatic control to suit your material and your process

makers of centrifuges for nearly 100 years



BROADBENT

ref. B3

THOMAS BROADBENT AND SONS LTD.
CENTRAL IRONWORKS HUDDERSFIELD
'Phone 5520/5 'Grams 'BROADBENT' HUDDERSFIELD

LONGWORTH WATER-FLOW SWITCH

★ Mercury contacts — cannot fuse together.

★ Operation of entire safety circuit can be instantly checked.

★ Variable sensitivity.

★ Adjustable for wide range of flow rates.

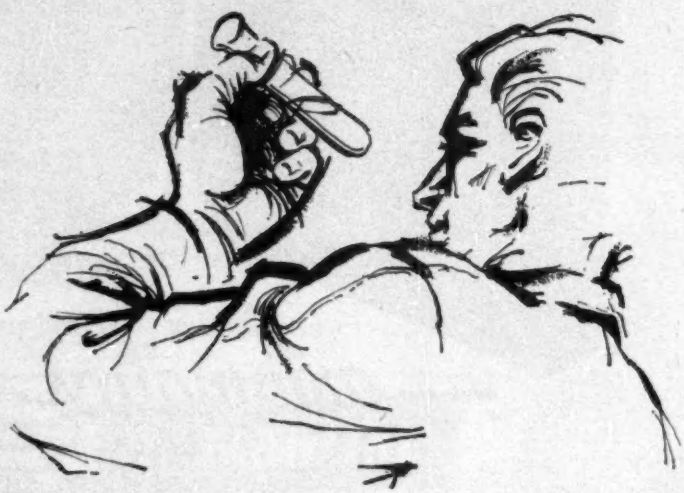
★ Up to 20 amp. switching capacity single or double pole.

★ On-Off or changeover switching available.

LONGWORTH SCIENTIFIC INSTRUMENT CO. LTD.
THAMES STREET · ABINGDON · BERKS
TELEPHONE · ABINGDON 982 (2 LINES) GRAMS · 'INSTRUMENT' ABINGDON

CRUICKSHANK'S

fluorides



AMMONIUM BIFLUORIDE
SODIUM BIFLUORIDE
LEAD FLUOBORATE
TIN FLUOBORATE
POTASSIUM FLUOBORATE
LITHIUM FLUORIDE
SODIUM FLUORIDE

If you are a user of Fluorides you cannot do better than contact Cruickshanks for competitive prices and speedy deliveries. Installation of up-to-date chemical plant, together with Cruickshank's own tanker delivery service cannot fail to appeal where quality of production and speed of delivery are of utmost importance. Descriptive literature available.

R. CRUICKSHANK LTD.
CAMDEN STREET · BIRMINGHAM
Phone : CENtral 8553. Grams : Cruickshank B'ham.

Chemical Works : Charles Street,
West Bromwich. Tel : TIPton 1117

CRUICKSHANK'S

SM/C 5707

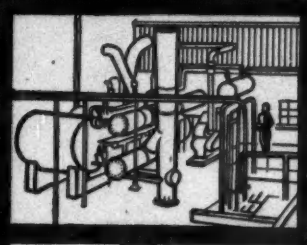
FILTER CRUCIBLES of Porous Porcelain

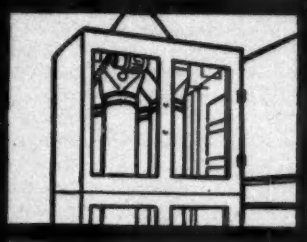
Made by

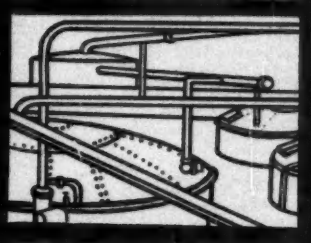
The **WORCESTER ROYAL PORCELAIN CO.** LIMITED

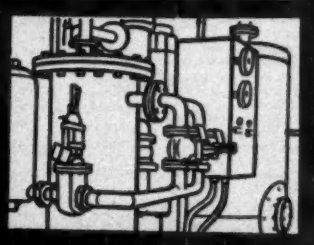
Supplied by all recognised Laboratory Furnishers.

retain the finest precipitates and filter rapidly. They are not affected by acids, remain constant in weight within very fine limits and can be heated to high temperatures.









SOLVENT RECOVERY

We reclaim volatile solvents lost from industrial processes by adsorption or counter current washing.
Solvent purchase costs usually reduced by up to 90%
Free technical survey and advice.

DUST AND MIST

Dust collection and filtration of air or gases. The CECAFILTER Continuous action at high efficiency improves performance of drying, grinding and pulverising applications.
Acid mist removal by electrostatic mist precipitators.

CARBON DI-OXIDE

Adsorption systems for the purification and drying of CO_2 from fermentation processes.
Complete plant can be offered including alcohol recovery and CO_2 liquefaction with or without dry ice production.

AIR AND GAS DRYING AND PURIFICATION

We design and build plant for all problems of moisture and contaminant removal by adsorption in the gaseous phase. Multi-adsorber units at a wide range of operating pressures. Low operating costs.
Methods include all types of solid desiccants.

CECA

THE BRITISH CECA COMPANY LIMITED
175 PICCADILLY, LONDON, W1 *Tel: HYDe Park 5131*

B. NEWTON MAINE LTD

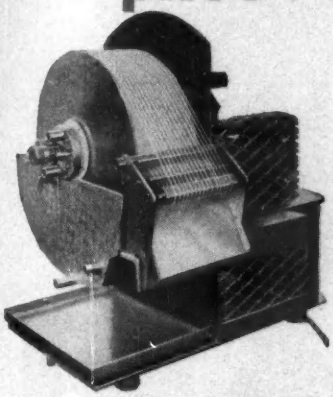
Silsoe, Bedford Silsoe 296

FOR RARE CHEMICALS

with emphasis on substances produced by HIGH PRESSURE HYDROGENATION

Abietic acid
Aconitine crystals
beta-Alanine
Aminoacetal
meta-Aminobenzotrifluoride
1,4-(bis-Aminomethyl(cyclohexane
9-Anthracene aldehyde
Arachyl alcohol 99%
Behenic Acid
Behenyl alcohol 90%
Behenyl alcohol 98%
Benzyl ethyl carbinol
Benzyl iodide
Benzyl isothiocyanate
Benzyl mercaptan
Bornyl benzoate
2-Bromoheptane
3-Bromoheptane
4-Bromoheptane
p-Bromophenacyl bromide
1-Bromo-3-propanol
Butadiene sulphone
Butene-2-diol-1,4
Calcium galactonate
Calcium glucoheptonate
Calcium glycerate
Capricnitrile 99%
Caprylnitrile 99%
Carbazole (very pure)
Cephalin (ex-Hog's Brain) pure
Cerium salicylate
ortho-Chlorobenzyl chloride
6-Chloro-hexanol-1
3-Chloro-propanol-1
2-Chloro-pyridine
Colchicine USP XIV
Copper guaiacol sulphonate
Cupric dibenzene sulphonate hexahydrate
Cyclodecanone semicarbazone
Cyclododecane
Cyclododecanol
Cycloheptane
Cycloheptanol
Cycloheptanone
Cycloheptylamine
Cyclohexane-1,4-biscarbinol
Cyclohexyl urea
Cyclooctanol
Cyclooctanone
Cyclooctanone isoxime
Cyclooctylamine
Cyclopentyl urea
Cyclopentylamine
Decahydrocinnamic aldehyde
Decahydro-beta-naphthyl acetate
beta-Decalol (cis/trans mixed)
Decamethylene-1,10-dicarboxylic acid
Decamethylenedinitrile
n-Decane 99% (Olefin free)
Decanediol-1,10
1-Decene 95%
n-Decylamine 99%
Diaminodecane-1,10
Diaminododecane-1,12
Diaminoheptane-1,7
Diaminononane-1,9
Diaminooctane-1,8
Diaminoundecane-1,11
1,4-Dibromobutene-2
Dibromodecane-1,10
Dibromohexane-1,6
Dibromononane-1,9
Dibromooctane-1,8
Dibromopentane-1,5
Dichlorodecane-1,10
Dichlorohexane-1,6
2,3-Dichloro-1,4-naphthoquinone
Dichloropentane-1,5
Dicyclopentadienyliron
Dicyclopentylamine
Diethanolamine salt of maleic hydrazide
Di-n-decylamine
Di-n-dodecylamine
Didymium salicylate
N-Diethyl amino acetonitrile
asym-Diethyl ethylenediamine
Diethyl suberate
2,3-Dimercaptopropanol
2,2-Dimethyl-diaminopentane-1,5
a,a-Dimethylglutaric acid
Dimethyl-methylsuccinate
2,7-Dimethyl-2,7-octanediol
2,4-Dimethyl-3-pentanol (Di-isopropylcarbinol)
3,3-Dimethylpiperidine
2,5-Dimethylpyrrole
2,4-Dimethyl resorcinol
2,5-Dimethyltetrahydrofuran (water free)
Dimethyl thapsate
Di-n-octylamine 99%
Di-iso-octylamine
n-Docosane 95%
1-Docosene 95%
Dodecahydro-beta-naphthyl acetate
n-Dodecane 99% (Olefin free)
1-Dodecene 95%
n-Dodecylamine 99%
2,2-Diphenylethylamine-1
n-Eicosane 95%
1-Eicosene 95%
1, 2-Ethanediol
4-Ethoxy-3 methoxy benzaldehyde
2-Ethyl-1-butene 95%
Ethyl-4-chloro-2-methylphenoxy acetate
6-Ethyldecanol-3
(Ethyl-(3-ethyl)-heptylcarbinol)
5-Ethylheptanol-2
(Methyl-(3-ethyl)-pentylcarbinol)
2-Ethyl-1-hexane 95%
5-Ethylnonanol-2
(Methyl-(3-ethyl)-heptylcarbinol)
6-Ethyloctanol-3
(Ethyl-(3-ethyl)-pentylcarbinol)
Eugenyl methyl ether
Ferric tartrate pure
Furfuryl acetate
Furoic acid 98% & 99.8%
Glyceryl-para-aminobenzoate
n-Heptadecylamine pure
Heptamethylenedinitrile
2,2,4,4,6,8,8-Heptamethylnonane 95%
n-Heptane 99% (Olefin free)
n-Heptanol-2 (Methyl pentylcarbinol)
Heptanol-3
Heptanol-4 (Di-n-propylcarbinol)
1-Heptene 95%
n-Heptylamine 99%
n-Hexadecane 99% (Olen free)
1-Hexadecene 95%
n-Hexadecylamine 99%
Hexahydrobenzaldehyde
Hexahydrobenzyl alcohol
(Cyclohexane methanol)
Hexahydro-p-xylyldiamine
Hexamethylenedinitrile
Hexamethylene-imine
3-Hexamethylene-imino-propionitrile
3-Hexamethylene-imino-propylamine
n-Hexane 99% (Olefin free)
Hexanediol-1,6
Hexanediol-2,5
Hexanol-2 (Methyl-n-butylcarbinol)
Hexanol-3 (Ethyl-propylcarbinol)
1-Hexene 75%
Hexylcinnamic aldehyde
1-Hexyne
2-Hexyne
3-Hexyne
Lanthanum salicylate
Lauronitrile (n-Undecylcyanide)
beta-Mercaptoethylamine HCl;
Mercury acetamide
Mercuric succinimide
5-Methoxy-1-chloropentene-2
5-Methoxy-3-chloropentene-1
6-Methylcoumarin
3-Methylcyclopentanediol-1,2
3-Methylcyclopentanedione-1,2
Methyl cyclopentylamine
3-Methy-5-ethyl-heptanediol-2,4
3-Methyl-5-ethyl-nonanediol-2,4
2-Methyl-7-ethylnonanol-4
(Isobutyl-(3-ethyl)-pentylcarbinol)
3-Methylheptane 95%
3-Methylheptanediol-2,4
3-Methylheptanol-2
(Methyl-(1-methyl)-pentylcarbinol)
3-Methylheptanol-5
2-Methylpentanediol-1,3
3-Methylpentanediol-2,4
3-Methylpentanol-2
(Methyl-(1-methyl)-propylcarbinol)
2-Methyl-1-pentene 95%
4-Methyl-2-pentene 95% (mostly trans)
Methylsuccinic acid
Methyltuberate
Myristonitrile 99% (n-Tridecylcyanide)
Nitrocyclohexane
5-Nitro-2-furfuraldehyde diacetate
5-Nitrofurfurylidene diacetate
o-Nitrophenylacetic acid m.p. 138°C
Nonamethylenedinitrile
Nonanediol-1,9
5-Nonanol (Di-butylcarbinol)
n-Nonylamine 99%
n-Nonylcyanide 99%
n-Octadecane 99% (Olefin free)
1-Octadecene 95%
n-Octadecylamine 99%
Octamethylenedinitrile
Octamethylene-imine
n-Octane 99% (Olefin free)
iso-Octanoic acid
1-Octene 95%
2-Octene 95%
1,8-Octolactam
n-Octylamine 99%
iso-Octylamine
Palmitronitrile 99% (n-Pentadecylcyanide)
Pentadecane (traces Tetradecane)
n-Pentadecylamine pure
n-Pentadecylamine 99%
Pentamethylenedinitrile
Pentanol-3 (Diethylcarbinol)
2-Pentyne
Phenanthrene-9-aldehyde
2-Phenylamino-pyridine
(2-Anilino-pyridine)
1-Phenylbutanol-2
beta-Phenylethyl iodide
beta-Phenylethyl isocyanate
beta-Phenylethyl isothiocyanate
Phenyl isopropyl aldehyde
3-Phenylpropylamine-1
bis gamma Phenylpropylethylamine Base
bis gamma Phenylpropylethylamine dihydrogen citrate
3-Piperidino-propionitrile
3-Piperidino-propylamine-1
Potassium creosote sulphonate
1, 3-Propanedithiol
3-Pyrrolidino-propionitrile
3-Pyrrolidino-propylamine-1
Resorcinol diethyl ether
Salicylhydroxamic acid
Salicyloyl hydrazide
Sebacyl dichloride $COCl(CH_2)_8COC$
Serotonin creatinine sulphate
Sodium dichloroacetic acid
Sodium phytate
Sphingomyelin (ex cerebro)
Stearonitrile 99% (n-Heptadecylcyanide)
trans-Stilbene
Suberic acid
Terephthalaldehyde
Terpineol iodide
Terpineol saponate
Terpineol isothiocyanate
n-Tetradecane 99% (Olefin free)
1-Tetradecene 95%
n-Tetradecylamine 99%
Tetrahydrofurfuryl salicylate
Tetrahydropyran
Theophylline-7-acetic acid
Thioacetamide
Thiosalicylic acid m.p. 160°C+
Triamyl citrate
Trichlorodimethylphenylcarbinol acetate redist:
Trichlorohexahydro-beta-naphthol
n-Tridecylamine 99%
Trimellitic anhydride
2, 6, 8-Trimethyl-4-nonanol
Tri-n-octylamine 90/95% & 99%
Tri-iso-octylamine
dl-Tryptophane pharmaceutical
L-Tyrosine
2-Undecanol (Methylnonylcarbinol)
6-Undecanol (Di-amylcarbinol)
n-Undecylamine 99%
Variamine Blue Indicator

for pilot . . .



The Stockdale laboratory rotary vacuum filter has a nominal filtration area of 1 sq. ft. and has been produced for fundamental process investigations.
The standard drum filter can be provided with string, knife or pre-coat discharge mechanisms and wash/compression assembly. It is arranged so that the drum and trough can be dismantled by removal of the valve head, and a disc filter and trough can be fitted in its place, using the same drive. The whole unit occupies only 5 sq. ft. of bench area.

STOCKDALE ENGINEERED FILTRATION SERVICE

Correct selection of the filter for any application is ensured by the preliminary investigations made by Stockdale's Filtration Engineers on customers' samples. Where necessary, special filters are designed to cover unusual requirements.

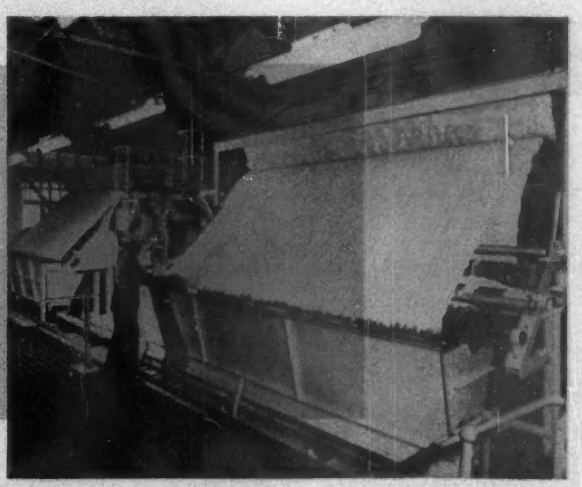
String Discharge Filters · Precoat Filters · Disc Filters
Scraper Filters · Horizontal Filters

Successfully Handle

Acetanilide
Alumina Hydrate
Aluminum Hydroxide
Aluminum Stearate
Barium Sulphate
Bauxite Sludge
Calcium Carbonate
Calcium Citrate
Calcium Hypochlorite
Calcium Phosphate
Calcium Stearate
Calcium Sulphate
Carbon
Cement
Clay
Cocoa Sludge
Cyanide Slimes
DDT
Disodium Phosphate
Fatty Acids
Gluten
Iron Oxide
Lactic Acid
Lime Hydrate
Lithium Carbonate
Lithium Stearate
Lithopone
Magnesium Carbonate
Magnesium Hydroxide
Manganous Acid
Neutralized Waste Pickle Liquor
Nickel Carbonate
Nylon Salt
Paper and Pulp
Penicillin
Phthallic Anhydride
Rubber Reclaim
Salt Mud
Sewage
Silica
Silica Gel
Sodium Arsenate
Sodium Carbonate
Sodium Ferrocyanide
Sodium Formate
Sodium Oxalacetate
Sodium Phosphate
Soybean Protein
Streptomycin
Strontium Carbonate
Starch:
Corn
Potato
Rice
Wheat
Sugar Muds
Sulfa Drugs
Synthetic Rubber
Tile and Porcelain Bodies
Titanium Hydrate
2, 4-D
Vanadium Ore
White Lead
Zein
Zinc Hydroxide
Zinc Oxide
Zinc Stearate
Zinc Sulphide

. . . or plant-scale processing

Manufacturing organisations throughout the world are benefitting from the installation of Stockdale filters. This illustration indicates the clean discharge and easy-to-process filter cake by strings. There is no limit to the thickness which can be handled and the filter cake is lifted in one continuous sheet.



STOCKDALE

FILTERS simplify Solids Separation

STOCKDALE ENGINEERING LTD · POYNTON · CHESHIRE *Telephone: Poynton 2601*

GLASS packing actively SELLS goods!

Housewives want glass-packing. They like glass because it enables them to see *exactly* what they're buying—and when it's time to buy more. Inexpensive, versatile glass has been shown to be a positive factor in creating sales.

The glass container industry is constantly evolving new and interesting packing techniques. It could be that glass packing will add to the sales appeal of your products—it's certainly well worth looking into.

See how good things are in

GLASS

PROVE IT WITH A PRACTICAL TEST ON YOUR OWN PRODUCTS

Use the Glass Container-Acceptance Testing Service to test consumer reaction to new pack designs *before* they go into mass production—in any or all of the following progressive stages:—

DESIGN PREFERENCE TESTING Any new design can be tested on a consumer panel of 400 families.

CONTAINER IN USE TESTING The new container and its product can be tried out in actual use in the home.

SHELF TESTING The sales appeal of a new container can be tested under real store conditions.

Further details of this service are contained in a booklet which you can get from your Glass Manufacturer or from the Federation.

THIS IS AN ADVERTISEMENT OF THE GLASS MANUFACTURERS' FEDERATION · 19 PORTLAND PLACE · LONDON W1 · TELEPHONE LANGHAM 6062

VOL. 85 No. 2166
JANUARY 14 1961

CHEMICAL AGE

Telephone: FLEet Street 3212 (26 lines)
Telegrams: Benformula - Cent - London

BOUVERIE HOUSE · 154 FLEET STREET · LONDON · EC4

Editor M. C. HYDE
Manager R. C. BENNETT
Director N. B. LIVINGSTONE WALLACE

Midland Office
Daimler House, Paradise Street, Birmingham. [*Midland* 0784-5]

Leeds Office
Permanent House, The Headrow, Leeds 1. [*Leeds* 22601]

Scottish Office
116 Hope Street, Glasgow C2. [*Central* 3954-5]

IN THIS ISSUE

Distillates	80
C. A. Survey of Sales Trends	81
Sulphuric Acid Review	83
Prospects for Benzole	85
Chemical Trade in Europe	87
Trends in Fertilisers	89
Plastics as Building Materials	92
Project News	94
Bids for Evans Medical	94
Chemical Careers Convention	100
Overseas News	102
Chemicals in the C.M.	104
People in the News	110
Commercial News	112
Market Reports	112
Trade Notes	114
New Patents	116
Diary Dates	116

Annual subscription is: home, 52s 6d, overseas, 60s, single copies 1s 6d (by post 1s 9d)

CHEMICALS IN 1961

THE three outstanding features of 1960 have been the maintenance of the overall chemical sales climb in the face of cutbacks in the production of cars and domestic electrics, the squeeze on profit margins and the very large number of major plant projects announced during the year.

Strength of the chemical industry lies in the fact that it supplies the raw materials for practically every industry—last year recession in Coventry was matched by a record fertiliser year; setbacks in sales to electrical firms being made up for by booming trade in many other directions. As the year ended there were no firm signs of a general recession as in 1958, but the possibility is there and it doubtless accounts for the cautious approach by chemical producers when discussing prospects for 1961.

It is clear that much of the industry's research and development effort in 1960 was aimed at improving existing techniques and processes and at finding new processes to replace older, less efficient, ones. As a result, many companies have been able to meet the pressure on profit margins, hold prices and in very many cases introduce substantial cuts.

Research with the aim of increasing productive efficiency still further will continue this year, with the aim of not only cutting production costs, but of enabling the industry better to withstand rising competition. In addition to many new plant projects, the British chemical industry will spend many £ millions in 1961 on improving processes and modernising plant. Expenditure will be heavy, but the rewards are big.

One of the biggest rewards of industrial chemistry is the fact that at any one given time much of the industry's profits is coming from products unheard of a few years previously. In our exclusive survey of chemical industry sales, firms replying acknowledge that higher sales last year were due in nearly 70% of the total to products introduced since 1955.

The British industry's first major new material of the 1960's was polypropylene; others are neoprene, sodium chlorite and sulphamic acid with polyvinylidene chloride, butyl rubber, nylon 6, to come. Many others are either now in commercial production for the first time in this country, or are planned for future production.

All this calls for heavy research expenditure as well as heavy capital spending. If new products are the life-blood of the industry, then new plants are equally vital. 1960 saw great activity in this direction; the signs are that 1961 will be still busier for many new projects have yet to be disclosed, including further projects on Severnside for I.C.I., as well as those of British Hydrocarbon Chemicals Ltd. for their newest petrochemical complex at Llandarcy.

The C.A. survey shows that some 75% of the companies polled plan to expand existing facilities; more than half are to announce entirely new projects.

The companies replying are a good cross-section of the industry, representing not only the largest producers, but also the medium-sized and smaller firms. With traditional conservatism they view sales prospects with

(*Continued in page 94*)

★ WILL third time be lucky for Fisons? At least their bid for Evans Medical Ltd. is their third publicised take-over attempt in the past 13 months. Now Glaxo Laboratories have entered the lists, capping Fisons' offer by £1.65 million. Evans directors who told stockholders to wait a further announcement before taking action on the bid by Fisons, intend to recommend acceptance of the offer by Glaxo.

Since their offer would absorb only about £2.5 million of their £6 million liquid resources, I expect Fisons to make a further move; there was no sign of this at the time of writing (see also p. 94).

Fisons were thwarted in their two previous take-over bids; for their latest attempt, however, they are advised by S. G. Warburg who have the reputation of never having 'lost' in such a struggle. For their first bid in December 1959, Fisons lost control of Crosse and Blackwell to Nestle Alimentana of Switzerland. In their battle for control of British Drug Houses last year, B.D.H. successfully held off by raising the dividend and making a scrip issue. Fisons have also been linked in two attempts to acquire Howards; last week Fisons denied that they were involved.

★ AT least a dozen Nobel Prize winners in chemistry will be among the thousands of scientists from some 40 countries who will attend the 18th International Congress of Pure and Applied Chemistry in Montreal next August. Those from the U.K. include Sir Alexander Todd, professor of organic chemistry at Cambridge and vice-president of the I.U.P.A.C., who won the Nobel Prize for his discovery of Vitamin B-12 and nucleinic acid. Another is Sir Cyril Hinshelwood, Lee's Professor of Chemistry at Oxford and president of the Royal Society, who shared a Nobel Prize for work in chemical reaction kinetics with Academician N. N. Semeonov, of Moscow.

Sir Cyril will definitely be at the Congress while Semeonov has been invited to attend. This I learn from a Canadian correspondent who obtained his information from Dr. Rudolf Morf of Basle, Switzerland, secretary-general of the I.U.P.A.C., himself a Nobel winner, for his discovery of a method of synthesising Vitamin A from acetylene after 17 years' research. According to Dr. Morf, another Nobel chemist to attend the Congress is Prof. Arne Tiselius of Stockholm, who developed electrophoresis as a tool for chemical investigation.

Immediately before the Congress, the twenty-first conference of I.U.P.A.C. will be held at the University of Montreal. One mammoth task for delegates to this business gathering will be the establishment of agreed rules for naming chemical compounds. Another tricky problem to be tackled is that of bringing chemical atomic weights in line with physical units.

★ "LIFE is a chain of enzyme reactions." Most of us would not agree that this is a complete answer to the problem of life, but from the point of view of an enzyme chemist working on some of the chemical reactions taking place in the cells of the body, it is beginning to look as though it is a very large part of the answer.

The human body contains about 10 million cells, each of which is capable of going through 2,000 to 5,000 different chemical reactions. Many of these reactions could not take place but for the activity of enzymes which speed up the reactions, themselves remaining unaffected. They can be destroyed only by wear and tear or by poisoning, and are all proteins.

Study of the nature and structure of enzymes is being carried out at the Institute for Enzyme Research at Wisconsin University. Recently research was started in a newly completed extension and with the added space a third major research team has been appointed.

★ CHEMICALS, in the form of firefighting foam, combined with some pretty slick work by the Royal Navy, saved the Norwegian tanker *Polyana*, loaded with 24,000 tons of crude oil, when she caught fire in the Persian Gulf recently. The blazing ship was abandoned but two ships of the Royal Navy went to her rescue. Signals received at the Admiralty prompted immediate action, as a result of which more than 3,000 gallons of Pyrene foam compound was flown to Bahrein in three aircraft. Further planes were standing by to fly additional supplies out. The fire was brought under control and a blanket of Pyrene foam was maintained to prevent re-ignition.

As proof of the success of this action, the *Polyana* has since put in at the Isle of Grain where her valuable cargo was discharged—a happy ending to an incident which could have resulted in a major shipping disaster.

★ EARLY this year (23 January, p. 160), a CHEMICAL AGE report of a promising commercial potential for dialdehyde starch aroused a great deal of reader interest. Because the material reacts with polysaccharides and proteins it is thought to have considerable promise in the adhesives field.

Now I learn that Abbott Laboratories have since dropped out of the market because of high production costs. While feeling that dialdehyde starch still has a useful potential, the company believes that much more applicational research will have to be done. Abbott's were licensed to use the process that was developed by the U.S. Department of Agriculture.

Also holding a modified U.S.D.A. licence are Miles Chemicals who having been quoting a price of $1-lb., but who feel that a price of 30 to 40 cents-lb. or even less is possible if production is stepped up to above the million lb./year level.

U.S.D.A. has now produced a dialdehyde starch derivative that forms good coatings on glass, metal and wood; a feature is resistance to boiling water and most organic solvents.

★ THERE is no doubt that the chemical industry will figure prominently in the minds of public school careers masters in the future. The 70 delegates to the Public Schools Appointments Bureau have seen many British industries at work during their regular conventions, but they freely told me last week that the organisation of the chemical industry was by far the most efficient.

They were entertained by a number of leading chemical companies who acted as hosts for the convention. Delegates I spoke to at the closing dinner were most impressed by the fine facilities they saw at the plants and laboratories visited, by the high calibre of speakers, as well as by the smooth arrangements.

For the latter—an object lesson in public relations—credit must go to Mr. F. H. Braybrook, director of Shell International Chemical, and his team. Reward for the organisers' efforts was in the reaction of the delegates. Two who had no previous contact with the chemical industry told me they felt the industry was a vital, progressive one which would offer many well-worth-while careers.

★ "THE art of selling is the art of establishing confidence according to Mr. D. R. Mackie, managing director of Monsanto, who was one of the convention speakers. He warned the careers masters that the U.K. would gradually lose its place as a leader in the world chemical industry if the right men were not found to do the selling.

Whatever the prospect in the rest of the world, a great deal of confidence has obviously been established in China—anyway by one British firm. Mr. C. F. Kearton, managing director of Courtaulds, told the convention that his company had sold enough cellulose acetate to China to give every Chinaman two combs and two fountain pens. He was hardly surprised when he visited China to find that in fact every Chinaman did have two combs and two fountain pens!

Alembic

Annual Review 1960 — Preview 1961

CHEMICAL FIRMS FORECAST 1961 SALES RISE OF 9.2%

★

'Chemical Age' Survey of Sales Trends in 1960 and Estimates for 1961

★

- Average sales rise in 1960 for all firms was 13.7%
- Biggest rises were for fine chemicals, pharmaceuticals and pesticides
- 75% of companies plan extensions; 50% have new plants in mind
- Just over half the companies would welcome merger of European trade blocs

SALES at home and overseas of the British chemical industry last year rose by an average of 13.7%, with exports increasing by 9.0%. The industry starts 1961 looking for an estimated rise in home and export sales of just over 9.2% and with nearly three quarters of the industry planning to extend existing facilities and just over half the chemical producers planning entirely new facilities.

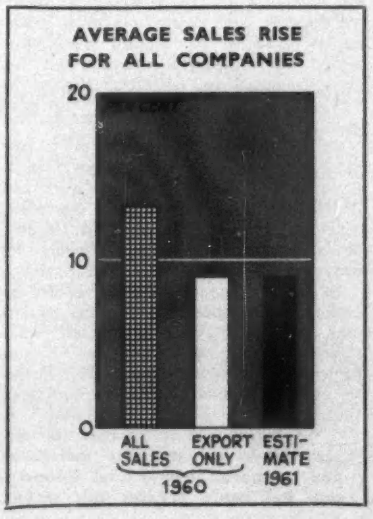
Nearly 60% of the industry would welcome a merger of the two European trading blocs. Throughout 1960 companies continued to invest in replacements, extensions, new plant and in research and development, with heaviest expenditure being in new plant and in research and development.

These trends are revealed in the annual 'Chemical Age' survey of trends. The fourth to be carried out by C.A., the current survey shows that the pattern of sales last year closely followed the estimates given in our 1960 survey (C.A., 9 January 1960, p. 65).

The pattern differed in various sectors of the industry—the biggest sales boost in 1960 being recorded by 'other fine chemicals', where total sales were up 24.9% on 1959. Pest control products, with a rise of 16.2%, came next, followed by 'pharmaceuticals, drugs', up 12.5%. The rise for 'coal tar products' was the lowest, being 6.3%.

So far as exports were concerned, dyestuffs led the field with an increase of 16.7%, followed by 'other fine chemicals' with a rise of 15%. Pest control products registered the lowest increase, one of 3.7%.

The average export increase for all sectors of the chemical industry of 9.0% is in line with the first nine months' official export figures, when the total of £235.78 million was 10.3% higher than the same period of 1959. The 11 months' figures show a rise of 8.6% over 1959 and include the full effects of the London dock strike.

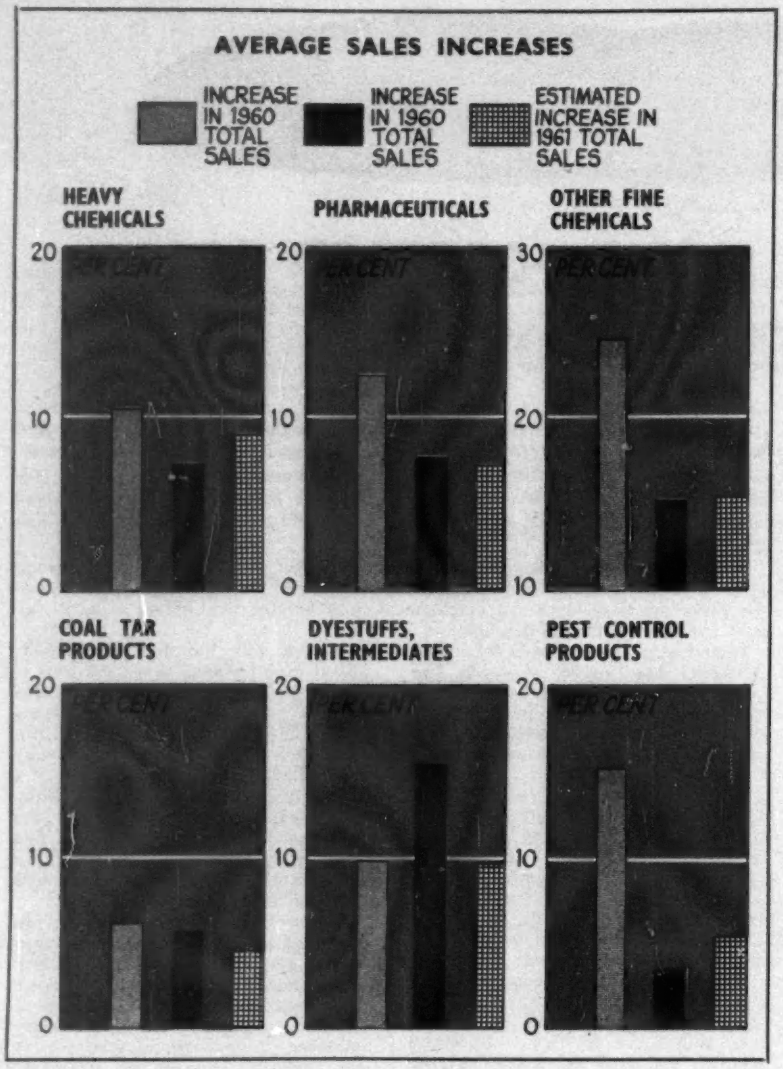


The largest increase in sales during 1961 is expected by producers of 'other fine chemicals', who estimate that total turnovers will rise by 15.1%. Next come dyestuffs with an estimated rise of 10%, followed by heavy chemicals, 9.6%.

Survey forms went to all U.K. producers of chemicals and allied products, and as was the case last year returns were received from just over 17%. Aim of this survey is to reveal general trends and the results do not indicate precise increases or decreases in sales for any one particular product; the figures are averages for broad sectors of the industry and should show producers whether or not they are getting their share of generally expanding markets.

In addition to the questions asked in the last annual survey, companies were also asked to state their attitude to a merger of the European Economic Community ('the Six') and the European Free Trade Association ('the Seven'). Of those replying to this question, 56% would welcome such a merger; 36% thought it would be against their interests; and 8% were doubtful.

Companies were also asked if they would be interested (a) in sales links with the Six and the Seven (35.6% said they would, while 8.1% already have such tie-ups; (b) in two-way production agreements (22.2% said they would, 5.5% said they were already partners to such agreements, and there were a number of 'don't knows'); (c) in setting up subsidiary production units in the Six or the Seven (13.5% would be in favour; 5.5% already have such branch factories and again there were a number of 'don't knows').



The four other questions asked were: 1. Approximate rise or fall in (a) 1960 total sales; (b) 1960 export sales, (c) estimated total sales in 1961. 2. Were higher sales due to (a) extended facilities, (b) new products introduced since 1955, or (c) more intensive sales drive. 3. By what approximate percentage did investment increase in 1960 in: (a) replacements, (b) extensions, (c) new plant, (d) research and development. 4. Had the company plans for (a) expanding existing facilities, or (b) any entirely new projects.

Of all the companies replying, 55.3% said that higher sales last year were due to extension of facilities; 65.8% acknowledged the impact of products introduced in the previous five years; and 79% said that their sales campaigns had been intensified.

Investment spending in 1960 increased by an industry-wide average of 4.8% on new replacements (biggest rises being in pharmaceuticals and heavy chemicals). Investment in extensions increased by 2.85% (heaviest in pest control products and fine chemicals). Biggest investment increase of all was in new plant, up by an average 6.3% (with dyestuffs, pharmaceuticals and heavy chemical companies showing the biggest rises). Research and development accounted for an investment rise of 7.7% (highest in fine chemicals, lowest in coal tar products).

Of the companies polled, 70.7% are planning to extend existing production facilities (notably in fine chemicals and pharmaceuticals), while 50% are planning entirely new facilities (main impetus being in fine chemicals, followed by heavy chemicals and pharmaceuticals).

In the following round-up of broad sectors of the chemical industry, returns that indicated abnormally high sales trends have not been taken into account in arriving at average figures. This analysis of sales trends also refers to official statistics where these are available.

We would like to express our sincere thanks to the many individuals and companies whose kind co-operation has made possible this survey.

Chemical Sales Trends Analysed by Main Groups

● **Heavy Chemicals.** Returns in this sector gave an average rise in 1960 home sales of 10.3%, individual returns, however, fluctuated widely from the lowest—a decrease of 10% over 1959—to the highest, up 55%. Most of the returns were around an increase of 10% and it is interesting to note that Board of Trade statistics for January to August show a 10.2% rise in the consumption of sulphuric acid.

Heavy chemical exports are shown to have increased on average by 8.6%, returns varying from a decline of 5% to an increase of 20%. For next year, firms expect that total sales will rise by an average of 9.6%.

Higher sales last year were attributed to extensions of facilities by 71.4% of the firms, to products introduced since 1955 by 57.1% and to more intensive sales drives by all the companies replying. Investment spending on replacements was up by an average 6.9%, on extensions by 0.28%, on new plant by 7.6% and on research and development by 2.31%. Just over 70% of the companies are planning to expand existing facilities and 55% have plans for new projects.

Only 35% of the heavy chemical firms believe that a merger of the 'Six' and the 'Seven' would benefit sales, but 52% would be interested in sales links with European companies. In each case only one company would be interested in two-way production agreements or in setting up subsidiary production units on the Continent.

U.K. production and consumption of sulphuric acid are given below:

SULPHURIC ACID
(100% acid)

	1960*	1959	1958
	Monthly averages, '000 tons		
Production	222.1	202.3	186.8
Consumption†	225.5	204.6	189.0

* Based on first eight months.
† Including recovered acid.

For further details of sulphuric acid in the U.K. see special article on p. 83.

Record Fertiliser Year

● **Fertilisers.** The fertiliser year 1959-60 saw a record use of fertilisers (p. 89) and final nitrogen deliveries from home and overseas exceeded for the first time the equivalent of 400,000 tons of nitrogen, an increase of 13%. The nitrogen increase was the largest in Europe. Industrial nitrogen use, estimated by *Nitrogen* at 140,000 tons N, was also much greater.

Sales of lime ammonium nitrate were also at a record level and ammonium sulphate deliveries (see C.A., 7 January, p. 10) were also high, affected by heavy imports. In 1959-60, phosphate consumption was up 19% while potash rose by 13%.

The year 1960-61 is expected to see

(*Continued on page 95*)

Sulphuric Acid Survey

U.K. Consumption Should Total 3 Million Tons This Year

FIVE years ago sulphuric acid plants which had been built since 1951 and which in the light of the shortage of elemental sulphur had been based almost exclusively on other sulphurous raw materials—pyrites, anhydrite, spent oxide—had increased sulphuric acid production capacity by far more than the normal growth in consumption could then match.

By the end of 1955, total acid-making capacity amounted to 2.6 million tons (100% H_2SO_4), almost a 50% increase since 1951. Although at that time there was some doubt whether industrial activity in the U.K. would advance at a sufficient pace to keep all plants at a high level of employment, some far-seeing producers even then were planning installation of new plant to raise output further by the end of the decade, that is 1960. This phase of development of the U.K. acid industry—now that brimstone was again in plentiful supply wholly based on this raw material—proved to be justified as sulphuric acid demand over the past five years rose at annual average rate of 7%.

Last year, the anticipated strong advances in general industrial activity continued until April. In particular U.K. chemical industry has shown no signs of slackening in its growth and output. Sharing in this boom has been the sulphuric acid industry; output has risen to the record level of just over 2.7 million tons (100% H_2SO_4) with plants working at nearly 90% of installed capacity, while consumption has continued to increase and now stands at a new peak of just under 2.8 million tons.

Sulphuric Acid Production. Concurrently with the rapid increase in sulphuric acid manufacture during the past five years from 2.1 million tons to 2.7 million tons, there have been changes in the structure of the industry and in the pattern of raw materials supply.

Amalgamation into a number of large groups of sulphuric acid manufacturers, notably the Laporte group and Associated Chemicals, has been an outstanding feature. At the same time a number of old plants have been taken out of commission by companies such as Imperial Chemical Industries Ltd. and Fisons Ltd., and some small producers have ceased to operate.

New plants built are almost exclusively of large capacity—100 tons a day or more. There are today in the U.K. over

By

The British Sulphur Corporation Ltd.

100 plants of which 31 are now 100 tons or more.

The predominant use of the contact process in new plants has increased the proportion of contact acid manufactured in the U.K. to 86%—among the highest in the world.

Raw Materials. Sulphur in all forms used in the manufacture of sulphuric acid in 1960 is expected to amount to 1,070,000 tons, the highest on record, 18.7% greater than in 1955 and 12% greater than in 1959.

Before 1950 brimstone was used in the manufacture of 54% of U.K. sulphuric acid. The expansion after 1951 of plant capacity based on pyrites, spent oxide and anhydrite changed the supply pattern of the industry and at the same time placed greater emphasis on the use of indigenous sulphur resources. In 1950 sulphur imports—brimstone and pyrites—accounted for 70% of the sulphur consumed by the acid industry. By 1956 this had changed to 57% and in 1960 60%, the remainder being represented by indigenous raw materials. Indigenous supplies of sulphur are in the form of anhydrite, spent oxide, sulphur dioxide in zinc smelter gases, ferrous sulphate and hydrogen sulphide and elemental sulphur recovered from coal and petroleum gases.

Indigenous sulphur supplies in all forms have also continued to rise to the record level of 610,000 tons sulphur equivalent, an increase of 4.5% over 1959.

Anhydrite production, which is estimated in 1960 at 1.8 million tons, expanded in keeping with rising demand. Anhydrite mining operations are maintained at I.C.I.'s mine at Casebourne, near Billingham—the largest in the U.K. and producing about 1.3 million tons annually, British Plaster Board Ltd.'s Long Meg mine which meets the needs of the United Sulphuric Acid Corporation and Solvay Chemical Company's mine at St. Bees, Whitehaven. Since 1957 I.C.I. have reorganised their anhydrite mining operations, introducing greater mechanisation so that productivity has increased, and 80 miners working on three shifts a day can mine about 23,000 tons or more of anhydrite a week.

Anhydrite acid plants—comprising six kilns operated by three companies—were worked to capacity throughout 1960 and it is expected that anhydrite production to meet their needs will rise to 780,000 tons, an increase of 4.5%. Heavier capital costs at anhydrite acid plants are offset by lower raw material costs and the value of the by-product produced. A further 1.15 million tons of anhydrite is estimated to have been consumed in the direct manufacture of ammonium sulphate.

Spent Oxide

Spent oxide usage is a notable feature of the U.K. sulphuric acid industry principally because the Statutory Regulations governing H_2S content of town gas result in large quantities of this material which contains up to 51% sulphur arising as a by-product. Consumption of sulphur contained in spent oxide at the peak of the sulphur crisis was 138,000 tons, but has since declined to 106,000 tons in 1959.

During the past 12 months, however, as the result of the heavy demands by the acid industry, spent oxide usage has risen and the year-end total is expected to amount to just under one-quarter million tons, 120,000 tons sulphur equivalent, an overall increase of 11% compared with the previous year.

Consumption of pyrites, which is wholly met by imports, declined substantially from the peak levels of 1956. This year it is expected to total 360,000 tons, an increase of 11% over 1959, reflecting the intensive activity of the

U.K. SULPHURIC ACID PRODUCTION

'000 tons 100% H_2SO_4

	1950	1955	1958	1959	1960*
Total	1,803	2,097	2,241	2,429	2,700
Chamber and tower	682	582	483	406	380
Contact	1,121	1,515	1,758	2,023	2,320
Total capacity	1,980	2,583	2,808	2,973	3,044
% Chamber capacity employed	91.0	81.2	79.8	81.7	77.0
% Contact capacity employed	94.7	85.0	80.4	84.3	89.7

*Estimated

industry as a whole. Demand is centred on the large installations built between 1951 and 1955 and is met predominantly in the form of Cyprus pyrites flotation concentrates.

The installation of the many large new brimstone acid plants has raised consumption of acid sulphur to the record level of just over 400,000 tons in 1960. Next to the U.S., the U.K. is the largest importer of brimstone obtaining its supplies from the U.S., Mexico and France.

Domestic recovery of elemental sulphur is increasingly contributing to available supplies. Recovered sulphur capacity in the U.K. has not greatly increased during the last year and is estimated at about 90,000 tons a year.

Current production at sulphur recovery plants appears to be running at about 65,000 tons a year, of which about two-thirds is consumed by acid manufacturers. A notable feature is that the bulk of this material is supplied in liquid form by road tankers, in which field F. W. Berk and Co. have carried out valuable development work, and are responsible for the increasing volume of liquid sulphur deliveries to industry. The supplies are obtained from the major oil refineries.

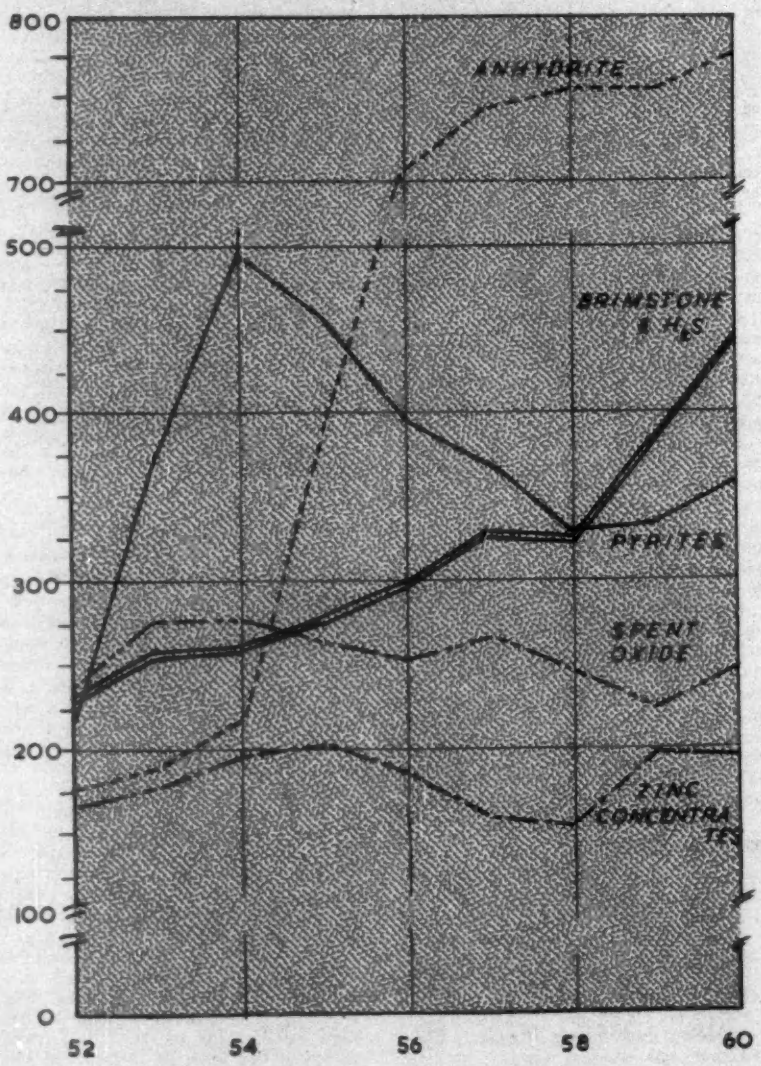
The only new sulphur recovery plant to come into operation in 1960 has been that based on hydrogen sulphide from the new hydrodesulphuriser at Shell Petroleum Co's Shellhaven refinery which started up in last May. It recovers 20 tons of sulphur a day from refinery gas. No sulphur recovery is taking place as yet at Esso Petroleum Co's new refinery at Milford Haven, but it is estimated that when the first stage refinery, now completed, is fully operational the amount of sulphur that could be recovered would be of the order of 25,000 tons.

U.K. Acid Consumption. The record level of sulphuric consumption in 1960 of 2.8 million tons, reflects the heavy overall demand by all acid using sections of industry among whom some were outstanding. The largest consumer of the acid is the fertiliser industry, and 650,000 tons are estimated to have been used in the manufacture of superphosphate and other phosphatic fertilisers, and 290,000 tons for that of ammonium sulphate. The titanium pigments industry which has grown spectacularly and consistently over the past decade is now the second largest single sulphuric acid consumer. In 1960 it consumed an estimated 450,000 tons or about 16% of total sulphuric acid production.

Other important users of sulphuric acid whose demand has increased strongly in the past year are rayon and cellulose film manufacturers, detergents, plastics, steel and oil.

Trade. Total imports of brimstone in 1960 which also include material used for non-acid purposes are expected to total about 480,000 tons. Of this, it is estimated that 300,000 tons originated from the U.S. and the balance almost equally between France and Mexico. This contrasts strongly with the previous year when total imorts of only 375,000 tons comprised 261,000 tons from the U.S., 65,000 tons from Mexico and 49,000 tons from France.

RAW MATERIALS USED IN SULPHURIC ACID MANUFACTURE
('000 tons of material)



Pyrites Imports

Similarly pyrites imports in 1960 are expected to show a rise of 14% to an estimated 250,000 tons, nearly all of which now originates from Cyprus, 83%, and this compares with the 1959 total of 213,000 tons of which 64% originated from Cyprus, and the balance from Canada, Sweden and Spain.

In addition the U.K. imports some 15,000 tons of sulphur filter cake originating entirely from the U.S. and used by Nitrogen Fertilisers Ltd. for sulphuric acid manufacture in a plant having many unique features.

Outlook. Many aspects of the expansion of the U.K. sulphuric acid industry in the past decade were influenced by the availability of raw materials. Today the outlook for the supply of brimstone and pyrites on which 58% of U.K. sulphuric acid manufacture depends is assured and the industry can expect for the foreseeable future to secure its raw materials at relatively low and stable prices. Of the indigenous raw materials a small expansion in the use of anhydrite is expected early next year when Solvay Chemicals Ltd. bring on stream their third kiln which will increase their own acid-making capacity by 50%. Another indigenous raw material which will gain in prominence is the use of by-product ferrous sulphate from steel-pickling liquors and titanium dioxide pigment effluent.

New developments in the coal gas industry may have an increasing impact on the U.K. acid industry from 1962 onwards. Adverse economics of the orthodox dry purification of coal gases have led the gas industry to look increasingly to alternative purification methods by liquid and other processes. As a result spent oxide supplies can be expected to

(*Continued on page 86*)

Prospects for Benzole

50 Million Gallons-a-Year Target for Pure Benzenes

BENZOLE is the by-product of the conventional carbonisation of coal in coke ovens or in gas works vertical retorts. It is also produced by the gasification of gas oils or fuel oils in the newer Segas or Onia-Gegi processes. The benzole can be stripped from the gas or obtained by distillation of the tar produced.

By
G. A. Vaughan, F.R.I.C.
Coal Tar Research Association

TABLE I
Crude benzole production

	M. Gall.
1953	106.4
1954	110.6
1955	110.6
1956	120.3
1957	122.5
1958	119.9
1959	112.3

Benzole is refined to give motor benzole and various grades of pure benzene. The recent production figures for these materials are given in Table II; they show that motor benzole production is declining and is therefore unlikely to reach a predicted figure of 35 million gall. by 1965, whereas that of pure benzenes has increased rapidly, doubling itself in five years, and can be expected to reach at least 50 million gall. by 1965.

TABLE II
Refined benzenes production

	Motor benzole	Pure benzenes
	Millions of gallons	
1953 ...	50.4	19.3
1954 ...	50.4	20.2
1955 ...	48.2	21.5
1956 ...	52.0	26.3
1957 ...	48.3	33.3
1958 ...	42.9	34.7
1959 ...	29.6	41.7

This whole production trend should, however be viewed against the withdrawal under E.F.T.A. agreements, before 1965, of the preference on indigenous light hydrocarbon oils. This may cause the quantity of benzole extracted to be reduced and will certainly considerably reduce the amount of motor benzole refined and will give a further incentive to the production of pure benzenes.

Uses. The great demand for pure grades of benzene as chemical intermediates has caused their production to double in the last five years (see Table II). Above the normal conversion to nitrobenzene and hence to dyestuffs, and the synthesis of phenol via the sulphonation of benzene, there has been a steady increase in the production of its chlorinated and hydrochlorinated derivatives *p*-dichlorobenzene, DDT and Gamexane.

However, the greatest demand for benzene has been for the production of styrene through ethyl benzene, thus showing a similarity to the United States in which 42% of the available benzene is converted to styrene. The published requirements of Forth Chemicals, Grangemouth for benzene, as shown in Table III, for the manufacture of styrene are typical of this growth.

TABLE III
Benzene requirements, Forth Chemicals

Year	Tons
1953	13,000
1956	22,000
1960	36,000
1962	73,000

Demand for benzene has also increased for its conversion to dodecyl benzene for detergents, to maleic anhydride for resins, to cumene by alkylation and hence to phenol; and also for its conversion to diphenyl. Plants using benzene which have been recently installed or are in course of construction, are shown in Table IV.

Refining. Refining processes for crude benzole have to remove such diverse impurities as sulphur compounds, e.g. carbon disulphide, mercaptans or thiophene; unsaturated hydrocarbons, e.g. cyclopentadiene; and saturated hydrocarbons (paraffins and naphthenes).

Removal of the lower boiling materials, particularly carbon disulphide (defronting) was done batchwise in a dry distillation column but the current trend is to use continuous fractionation such as the Holmes/Taylor column or the A.P.V. continuous defronting unit.

Acid Washing. The conventional method of purification of defronted benzole is by sulphuric acid washing, a method which is still holding its own against the new catalytic refining methods due to the introduction of modern techniques such as the pulsed column.

The acid wash removes the sulphur compounds including thiophene. It removes the unsaturated hydrocarbons and also attacks the aromatic hydrocarbons to a small extent but has little effect on the saturated hydrocarbons present. It follows that pure benzene of high crystallising point cannot be produced by acid washing from a benzole containing appreciable quantities of saturated hydrocarbons, i.e. a low gravity benzole.

Catalytic Refining. During the last decade attention has been paid to the catalytic refining of benzole, resulting in the development of a number of hydrorefining processes. One such process by the German firm of Lurgi is used in two benzole refining plants recently installed in this country. In the hydrorefining process the benzole is reacted with hydrogen or coal gas under pressure at medium temperatures using a catalyst based on cobalt/molybdenum oxides. The unsaturated compounds are reduced to saturated hydrocarbons as are the sulphur compounds which also give hydrogen sulphide. The latter is washed from the product which is then fractionated to give a low sulphur (<5 p.p.m.) benzene.

TABLE IV
Plants using benzene

PLANT	TONS/YEAR	COMPANY	PROGRESS
Styrene	20,000	Forth Chemicals	On stream 1956
Styrene	18,000	Shell Chemicals	On stream 1959
Styrene	20,000	Forth Chemicals	Completion 1960
Styrene	50,000	Forth Chemicals	Completion 1961
Maleic anhydride	6,700	Monsanto Chemicals	Completion 1960
Maleic anhydride	(5,000)	Alchemy	Completion 1960
Dodecyl benzene	10,000	Grange Chemicals	On stream 1955

TABLE V

New Benzole Refining Plants

PLANT	MAKER	CAPACITY M. gal./yr.	SITE	STREAM
Hydrorefining/ fractionation	Lurgi	9.7	Lancashire Tar Distillers Cadishead	1959
Defronting/ acid wash/ fractionation	A.P.V.	5.0	Lincolnshire Chemical Co. Scunthorpe	1959
Hydrorefining/ fractionation	Lurgi	4.5	Port Talbot Chemical Co.	1960
Defronting (acid wash)/ fractionation	A.P.V.	—	British Celanese, Spondon	1961

As in the acid washing process the saturated hydrocarbons present are not attacked, in fact even under the mildest conditions a little hydrogenation of the aromatics to naphthenes takes place. If some of these saturated hydrocarbons cannot be separated by fractionation then a pure benzene cannot be obtained. So again only a high gravity benzole (low in saturated hydrocarbons) can be hydrorefined to give a high crystallising point benzene. On the other hand the process has the advantage of being continuous and giving a higher yield of product than that by acid washing.

Freeze-refining. It is thus obvious that the production of pure benzenes from low-gravity benzoles presents a problem. There has, however, been an interesting development as patents issued to the Coal Tar Research Association show (1). These patents indicate that pure benzene in high yields may be obtained from acid-washed or hydrorefined low-gravity benzole by a continuous freezing process. Very high crystallising point benzenes may be obtained and the process is apparently economic as the by-product is a motor benzole. A commercial development of the process has been patented by Newton Chambers and Co. Ltd. (2).

New Refining Plants. Table V gives the benzole refining plants which have been or are in course of erection.

Benzene from Petroleum. Benzene can be obtained from virgin, hydroreformed or cracked petroleum naphthas of B.Pt. 65-125°C by extractive distillation with phenol, azeotropic distillation with methyl ethyl ketone, or by solvent extraction with liquid sulphur dioxide or diethylene glycol (Udex). The resulting benzene, like that from coal, contains small proportions of unsaturated and saturated hydrocarbons and presents similar refining difficulties in the production of high crystallising point benzenes. This is apparent from a number of patents (3) issued to petroleum in which sulphuric acid refining is referred to.

Nevertheless it can be expected, with the greater control that the petroleum refiner has over his raw materials and his greater concentration of production capacity that the conversion of petroleum to benzene presents a real threat to benzole from gasification processes.

The first two U.K. benzene-from-petroleum plants were announced in 1960. In association with California Chemical Co., British Petroleum Co. are to produce ethylbenzene at the Isle of Grain, while British Celanese are to install an A.P.V. plant for benzene at Spundon. Both are due in production in 1961, but capacities have not been announced.

REFERENCES

1. B.P. 846,712 and B.P. 846,713.
2. French P. 1,241,916.
3. B.P. 755,535, B.P. 794,555, B.P. 818,749, U.S.P. 2,761,887.

7-8% Growth Rise in U.K. Industrial Demand for Sulphuric Acid

(*Continued from page 84*)

diminish. Among new processes the following are important. The fluidised bed process developed by Appleby-Frodingham which converts hydrogen sulphide in coal gas direct to sulphuric acid, is already in operation and, being economic, is likely to find wide application. Processes like the Stretford, hot potassium carbonate and others are proven or at an advanced development stage and offer greater economy in that they readily permit the extraction of noxious sulphur compounds and allow the production of elemental sulphur or sulphuric acid. The Gas Council's aim to produce increasing volumes of gas by complete gasification of low-grade sulphur-containing coals will at the same time result in substantial production of sulphuric acid or elemental sulphur.

The Westfield works set up by the Scottish Gas Board and just coming into operation, and the new Coleshill plant of the East Midlands Gas Board which will also use the Lurgi process, due on stream in 1963, are likely to be the forerunners of a series of large gasification plants throughout the country. It is estimated that Westfield, when in full production, will be capable of supplying about 300 tons of sulphuric acid a day using coal containing about 1% of sulphur. Since other coals contain 2 or even 3.5% of sulphur, an annual supply of 300,000 to 350,000 tons sulphuric acid or elemental sulphur equivalent by 1970 based on coal gasification may be expected.

1960 has been an exceptional year for the sulphuric acid industry not only because of the actual large increase in production and consumption, but also because the traditional seasonal decline in the industry's activity did not take place in view of the universally high level of demand. In common with other Western European countries there is every indication that the industrial demand for sulphuric acid will continue to rise, and provided that sulphuric acid demand for fertilisers maintains its steady growth the outlook for the next two years is one of steady increase of not less than 7-8%.

Fertilisers. At present there is substantial expansion of plant capacity in the fertilisers industry with the development of high analysis fertilisers which require phosphoric acid, notably at new plants by Fisons Ltd., and I.C.I.'s subsidiaries, Richardson Chemical Manures, Northern Ireland, and Scottish Agricultural Industries, Sandilands. A smaller development is being undertaken by the Farmers Company at Brigg, Barton-on-Humber, where a new 50-tons-a-day sulphuric acid plant will meet the needs of the company's complex fertiliser manufacture. These developments are taking place to meet the demand for high-analysis compounds based on ammonium phosphate.

Titanium Oxide. Although the steep expansion phase of this industry has now been accomplished, steady growth of TiO_2 pigment demand is foreseen. Increasing activity in this industry will strengthen its position as the second largest U.K. sulphuric acid consumer.

Man-made Fibres. Having weathered the slump of 1958, the rayon industry, the fourth largest user of sulphuric acid in the U.K., following a successful year in 1960 expects to maintain its share of the growing demand for man-made and synthetic fibres. The prospects are particularly favourable for rayon staple and rayon filament embodying new properties.

Cellulose Film. The notable expansion during the past 18 months in the manufacture of cellulose film is merely an indication of the substantial growth to come in the next two or three years, even though competition with plastics films is increasing. To meet anticipated demand new plants and expansions are under way by British Enka at Aintree and Transparent Paper Ltd. at Barry.

In 1961 sulphuric acid consumption can be expected to increase to little short of 3 million tons, more than justifying the expectations of far-seeing members of the industry. The expected growth of industrial activity and in particular that of the chemical industry in the early '60's will demand a corresponding expansion of the U.K. sulphuric acid industry, the fifth largest in the world.

Trade with West Europe

E.E.C. Not Likely to Lead to 'Decline and Fall' of U.K. Chemical Exports

BRITISH chemical exports have been increasing both in value and as a percentage of total exports in recent years. Exports to Western Europe have made a notable contribution to this achievement and now form more than a quarter of total chemical exports.

Of especial note is the trade with the countries of the European Economic Community which appears to be growing at a faster rate even than with countries of the European Free Trade Association. This is a very good example, contrary to first impressions, that it is with the most industrialised countries possessing highly developed economies that the major opportunities for trade exist. This is particularly so when contrasted with the primary producing countries and is highlighted by U.K. chemical exports to the Commonwealth.

Many Commonwealth countries are primary producers or are in the first stages of industrial development and the table below illustrates its decline in relative importance as a recipient of U.K. exports. It would be foolish, however, to omit from consideration of future U.K. chemical trade this huge area which, at present, takes over two-fifths of U.K. exports and has such obvious tremendous growth potential in the long term.

Despite these apparently favourable developments, doubts are currently expressed at the future of Britain's trade with Western Europe, particularly in the light of the advent of the European Economic Community.

The European Economic Community (E.E.C.), consisting at the moment of some of the most highly industrialised countries of Europe, i.e. Belgium, France, Italy, Luxembourg and Western Germany, the so-called 'Six', was inaugurated in 1957 by the Treaty of Rome. It can never be too strongly emphasised that this body was conceived by its protagonists as means of progressing towards a United States of Europe. It was believed that, in this day and age, the concept of fiercely competing nation states was obsolete and that in the face of the increasing power of the United States and Soviet Russia, with China ever in the background, close and intimate co-operation of the Western European nations was an urgent necessity.

As a step towards ultimate union, a customs union was proposed which would eliminate import duties between individual members, erect a common tariff against third parties and remove other barriers, e.g. quotas, to free trade in industrial products between countries of the union. This tariff harmonisation would be accompanied, *inter alia*, by harmonisation of social services and investment policies, moves to facilitate free transfer of labour and capital within the Community, the founding of an Investment Bank and the establishment of a Development Fund to assist in developing the associated overseas territories, which meant, in particular, the African territories of France.

By contrast, the European Free Trade Association (E.F.T.A.) is far more empirical in approach. Arising out of the British Government's suggestion for a Free Trade Area comprising all countries of Western Europe, it comprises the so-called 'Seven'—Norway, Sweden, Denmark, Austria, Switzerland, Portugal and the U.K.—who were for one reason or another unable to join E.E.C. The essential feature of E.F.T.A. is that, while the parties progressively eliminate duties and industrial products between themselves, each individual member in contrast to E.E.C., is free to determine the level of its own particular tariff against third parties. This is of particular importance to the United Kingdom, in enabling the Commonwealth preferential rates of duty to be maintained and necessitates the existence and policing of rules of origin to ensure that goods granted preference have been the product of substantial work performed in E.F.T.A. countries.

U.K. CHEMICAL EXPORTS

	1958 £m	% of Total	1959 £m	% of Total	1960* £m	% of Total
The Six						
Benelux	16.15		18.79		19.14	
France	7.67		6.99		6.50	
Italy	7.72		9.35		8.69	
W. Germany	10.46		11.07		10.98	
	42.00	16.6	46.20	15.8	45.31	17.5
The Seven						
Austria	1.02		1.28		1.17	
Denmark	5.17		5.60		4.96	
Norway	4.65		5.19		4.55	
Portugal	2.83		2.95		2.79	
Sweden	7.63		9.49		8.66	
Switzerland	3.07		3.73		3.54	
	24.37	9.3	28.24	9.6	25.67	9.9
Commonwealth	120.29	46.0	127.95	43.7	109.42	42.2
Rest of the World	74.87	28.1	90.71	30.9	78.73	30.4
TOTAL	261.53	100.0	293.10	100.0	259.13	100.0

* January to October.

E.E.C.-E.F.T.A. Merger Prospects Not Good

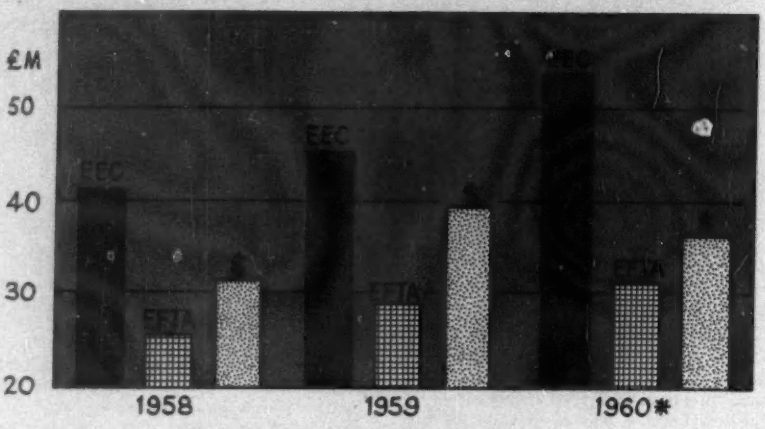
So long as E.E.C. retains its supranational institutions and common external tariff, it is difficult to see how the U.K. and her partners, without a radical change of policy, can subscribe to the Treaty of Rome with all the implications and commitments to the Continent of Europe which this entails. To the onlooker, it must be confessed that the prospects of a rapprochement in the near future do not appear bright.

E.E.C. now enters tariff negotiations as a single entity speaking with a united voice, and it is on this basis that the current G.A.T.T. negotiations are being held. It is, of course, possible that E.E.C., as a group, might associate with E.F.T.A. However, it is not easy, particularly with the present U.S. dollar difficulties to see the experienced E.E.C. statesmen permit discrimination against U.S. exports by granting reciprocal tariff concessions to other European non-E.E.C. countries.

Is the future for the U.K. chemical exporter to Europe, therefore, one of unrelieved gloom?

As at 1 January 1961, E.E.C. members had reduced their tariffs as between themselves by some 30% and these cuts had been extended to all signatories to the G.A.T.T. insofar as the tariffs in question exceeded the final E.E.C. common tariff level, which is based on the average of member countries' individual

CHEMICAL EXPORTS TO EUROPEAN ECONOMIC COMMUNITY, EUROPEAN FREE TRADE ASSOCIATION AND DOLLAR AREA



*** 1960 figures are based on first 10 months**

tariffs. As from the same date a start has been made to increase the low tariff levels of individual members towards the eventual final E.E.C. level. As a broad generalisation, a start has been made to increase the tariff levels of Western Germany and the Benelux countries, Britain's best European customers, and to lower the Italian and French tariffs.

Meanwhile the 'Seven' has so far reduced their tariffs against each other by a margin of 20% while making no concessions to members of E.E.C., although it is conceivable that at the current G.A.T.T. negotiations some worthwhile reciprocal tariff concessions might be negotiated. In this connection it is worthy of note that, speaking generally, Britain's E.F.T.A. partners are low tariff countries and so British exporters will not obtain the same margin of benefit from tariff reductions as other E.F.T.A. countries will obtain in the U.K., which has relatively high tariffs.

Population Trends

E.F.T.A.'s total population is in excess of 85 million, which the U.K. contributes over 50 million, situated in a sprawling fashion on the perimeter of the E.E.C. The Community, on the other hand, presents a picture of a compact growing market of over 160 million with excellent internal communications and protected by a common tariff. It appears that this common E.E.C. tariff will not be unduly severe and certainly, so far as may be judged, will not be of the severity, for example, of certain parts of the U.S. tariff.

Geography, of course, also plays an important part in deciding the flow of trade, and here the central position of E.E.C. with short land routes to most E.F.T.A. countries is an important factor. It is probably in the more highly processed chemical materials, which are better able to bear relatively high transport costs, that the United Kingdom's main prospect of trade expansion will lie, although there will always be local marginal shortages and surpluses of basic chemical products which will cause trade to flow almost regardless of distance and tariff barriers.

When all is said and done, the expansion of a country's economy and the direction of trade is often influenced by intangible factors. At the present time, although only marginal tariff alterations have been made to date, the E.E.C. has generated a powerful air of growth and expansion which has been attracting U.S. and British capital in increasing amounts during recent months. In this way, U.K. and other chemical manufacturers can participate directly in the growth of this enormous market although establishing yet more competition in the export markets of the future.

The future of British chemical trade to Europe is not easy to predict. One thing can be said with absolute confidence, however—the life of the U.K. chemical exporter will not be dull! Also it is not likely that the building up of E.E.C. external tariffs will lead to a decline and fall of U.K. chemical exports.

U.K. Chemical Exports Up Nearly 9%, but Imports Rise 31%

In the first 11 months of 1960, U.K. shipments of chemicals were valued at £289,085,321, an increase of 8.6% on January-November 1959, when the total was £266,083,275. Exports in November were valued at £29,974,758, compared with a monthly average for January-November 1960 of £26.2 million. The 1960 total will for the first time exceed £300 million, and will probably be well in excess of £310 million.

Imports of chemicals in the first 11 months of 1960 were valued at £161,029,508, 31% up on the 1959 11-months total of £123,685,921 and well in excess of the figure for the whole of 1959—£138,366,311.

Biggest slice of the increase came from North America. Imports for the period from the U.S. valued at £46.3 million (£29.8 million) rose 54%, while those from Canada were worth £10.3 million (£7.8 million). Big increases were also recorded for imports from the Soviet Union (more than doubled at £739,733); and the Common Market countries—West Germany (up £4.2 million at £25.8 million), the Netherlands (up £3.1 million at £12.3 million), France (up £2.2 million at £13.6 million) and Italy (up £2.2 million at £5.8 million).

Limited Opportunities for U.K. Drug Exporters in the Philippines

In spite of the fact that demand for pharmaceutical products in the Philippines greatly exceeds supply, imports of such products have declined steadily in recent years, supply being restricted by the amount of foreign exchange which the Central Bank is prepared to make available for imports. Imports of medicinal and pharmaceutical products amounted to some £3.2 m. in 1959 compared with £3.65 m. in 1958 and £4.9 m. in 1957.

A large proportion of imported drugs and pharmaceuticals are in the bulk form, being processed and packaged by the local industry. The trend towards larger imports of raw materials and smaller imports of preparations in dosage form is likely to continue and intensify with the development and expansion of the domestic industry. Exports are small but are increasing each year, amounting to £27,875 in 1959 compared with £18,150 in 1958 and £5,690 in 1957.

Dominating the import scene is the U.S., which in 1959 supplied 76.1% of imported medicinal and pharmaceutical products. A number of U.S. manufacturers have established subsidiary manufacturing companies in the Philippines. Other principal suppliers are Switzerland, Japan, West Germany and Hong Kong.

U.K. suppliers, on the other hand, were slow to explore the Philippines market at the time when, soon after the war, local companies were seeking connections with overseas manufacturers. As a potential market, the Philippines now faces the U.K. supplier of pharmaceutical products with certain difficulties although there are still reasonable prospects for the U.K. firm which feels able to come to an agreement with a local company to process and package its products in the Philippines.

The foregoing points are made in a report issued by the Board of Trade, Export Services Branch, Theobalds Road, London W.C.1, from whom further information can be obtained by quoting the reference E.S.B. 5867/8/59.

A further report from the same source (ref. E.S.B.29206/60 deals with the market for pharmaceuticals in Portuguese East Africa.

1960 SAW BIG LEAP FORWARD IN U.K. CONSUMPTION OF NITROGEN, PHOSPHATE AND POTASH

Annual Review of U.K. Fertiliser Trends

1960 was a record year for fertiliser usage in the U.K. Consumption of nitrogen for the first time topped 400,000 tons in one fertiliser year, a rise of about one-fifth. Also used were more than 480,000 tons of phosphate, a similar rise; and over 420,000 tons of potash. Indications are that this growth rate was exceptional

By D. P. Hopkins, B.Sc., F.R.I.C.

OUTSTANDING event of 1960 for British fertilisers is statistical—the sharp jump forward in consumption for 1959-60. Admittedly the official data are still provisional estimates but any adjustments made later will not alter the main point—a rise in nitrogen consumption of about one-fifth, in phosphate consumption of about one-fifth, in potash consumption of well over one-tenth. These are large changes for a single farming year.

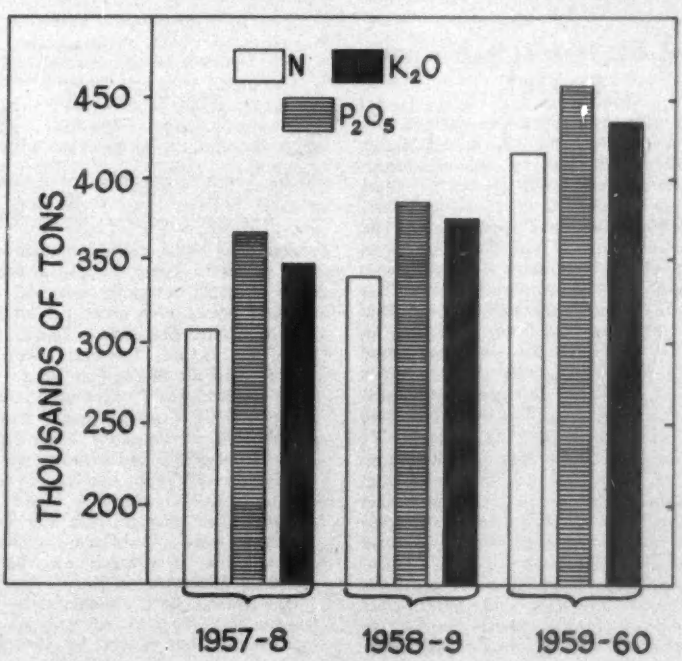
	N	P_2O_5	K_2O
	(1,000s of tons as plant-food)		
1958-59	340.8	385.2	375.6
1959-60	414.6	458.8	424.5
% rise	22	19	13

We know well enough that annual fertiliser consumption falls far short of the optimum use, and this gap between practice and perfection will be discussed later. We expect annual progress that helps to narrow this gap. But it is doubtful whether any one, however fertiliser-enthusiastic, would have predicted the 1959-60 scale of expansion. Is it a sign of the 1960s? Or is it just a phenomenon?

The annual report for Fisons Ltd. by Sir Clavering Fison suggests that the latter interpretation is wiser: "The past year has been one of exceptional prosperity . . . in particular, our fertiliser business benefited from the unpredicted increase in sales . . . I think that general conditions are not as buoyant as last year, and this is borne out by the official figures."

Nevertheless, any set-back in 1960-61 will be reasonably attributable to the appallingly bad agricultural weather of the 1960 summer and autumn, whereas the advance in consumption for 1959-60 is not as obviously explicable by the good conditions of the 1959 summer and autumn. This autumn has brought a huge shortfall in ploughing and cereal-sowing with consequent reduction in autumn fertiliser demand; it remains to be seen how much of this will be made up for by extra spring cereal sowings, and indeed whether the fertiliser trade and industry can fully cope with what is likely to be a record spring demand.

U.K. CONSUMPTION OF MAJOR FERTILISER NUTRIENTS



We have to reflect that fertiliser use on our grassland has long been meagre, with a great deal of educational effort, official and commercial, exhorting expansion. By contrast, use on arable crops has been much bolder, in the cases of a few crops—potatoes and sugar-beet—often quite near optimum levels. Lacking up-to-date survey information, at any rate on a broad enough basis to be national, we can only guess how much of the recent expansion has been on the neglected grass acreages.

Rises of 22% and 19% in nitrogen and phosphate consumption require considerable explanation. Granted there was a rise over the previous year in arable acreage, but totally of only about 3%; however, total cereal acreage (England and Wales) rose by some 6%, and the sunny summer of 1959 may well for cereals have stimulated more use of nitrogen top-dressings.

Allowing for these arable land effects, there still remains a sizeable part of the expansion to be explained, and surely grassland use must provide the answer. A further clue is that some of the phosphate rise can be attributed to higher supplies of basic slag, more slag nowadays being imported to add to limited home supplies. Basic slag is predominantly a grassland fertiliser, especially in the larger grassland farming areas of the country's wetter half. Another clue is that potash consumption has not risen as steeply. For arable use a more closely similar rate of expansion for nitrogen and potash would be expectable; on grassland, particularly if on many acres moderate nitrogen use was being initiated, similar attention to potash would not be as likely. It is not a wild guess to think that at least half the 1959-60 advance in nitrogen and phosphate can be accounted for by expanding use of fertilisers on grassland. If so, it is an expansive trend that should not only endure but increase.

Need for New U.K. Nitrogen Source?

The 22% rise in nitrogen use is a fact that re-opens the main discussion of this similar report last year (see CHEMICAL AGE, 9 January 1960, pp. 75-76). Then the new additions to U.K. nitrogen were regarded as long-term developments. The main addition, the new Shell works in Essex, gave an addition of slightly above 20% of 1957-58 national output. Unless 1960-61 nitrogen use shows a sizeable reduction from the new level set by 1959-60, much of the expanded home output is already accounted for, and is not, as said here last year, a forward-looking move to deal with a prospective rise during the 1960s.

Another influence that may have contributed to expansion of demand is that of lower fertiliser prices. The larger farmers know that they must use fertilisers and might well use no less per annum were there no subsidies as production grants and if prices remained unreduced; but price tends to influence the outlook of the smaller farmers, so many of whom have been meagre users. Recent price cuts before the start of the farming year, 1960-61, had saved farmers at least £11 million on their fertiliser bills; the further reductions as from July 1960 probably bring an additional saving of £3 million.

A second influence is the rise in nutrient content of compounds, also discussed here last year; though farmers when using these more concentrated fertilisers tend to reduce rates per acre, they do not always reduce rates to the mathematical equivalent of previous rates with less concentrated products. It is not irrelevant to note that according to a report from one of the biggest producers the 1959-60 expansion was largely accounted for by increased compound usage. It is probable that compound usage, tonnage-wise not in terms of NPK, is around 2,800,000 tons as against about 2,100,000 tons, the annual average for 1952-55. Compounds possibly now account for 75% of national dressings. If these assessments are anywhere near truth, which is likely, then the modern trend towards higher-analysis compounds must have a marked effect upon total NPK-consumption, for this has a potentially expanding influence on three out of four tons used.

O.E.E.C. Study

During the year a study by O.E.E.C. dealt with the gaps between actual and optimum use for many countries. In this study optimum use was defined as the application of maximum rates that would show profit to all the various crop or grass acreages of a country, taking into account the then current prices of fertilisers, crops and utilised grass output. Encouraging though last year's expansion may be, it is still apparent that U.K. use shows a wider gap with optimum use than is shown in many other progressive countries.

U.K. FERTILISER USAGE

	1956-57 use	Optimum economic use as calculated	Percentage of optimum being used
N	... 292,791	597,190	51%
P_2O_5	... 371,165	461,470	80%
K_2O	... 316,122	564,630	56%

(N.B.: These figures differ from those in the O.E.E.C. Report as they have been converted from metric tons.)

Assuming that fertiliser prices and crop values have not changed in balance since 1956-57 (a rough assumption as fertiliser prices have fallen usefully), we can bring the new figures for 1959-60 into this picture. Currently we have advanced to the extent that we are now using for nitrogen 57% of optimum, for phosphate 90% of optimum and for potash 75% of optimum. Even on our 1956-57 phosphate consumption we were as close to optimum use as any other country except Holland, who was exceeding her optimum rate. But several countries were considerably closer to optimum use of nitrogen, e.g., Belgium at 68%, Denmark 64%, W. Germany 73%, Iceland 76%, Netherlands 71%, Sweden 71%. Then at only 51% we were far behind, though now at 57% some of this gap has been made up. For potash several other countries were also ahead in their closeness to optimum use; Belgium 91%, Denmark 79%, W. Germany 81%, Netherlands over 100%, Sweden 61%, but now with a 75% rate for potash we have considerably closed this gap.

Clearly it is still nitrogen use that needs most attention here. However, some caution must be exercised in accepting the calculated optima for nitrogen. The optimum nitrogen rate for any acre of grassland varies according to use—if used for grazing only, the optimum rate will be lower than if also cut for hay; and the hay rate will be lower than if the grass is cut often for making silage. The same, to a lesser extent, is true of potash optima, for these, too, should rise with intensity of grass utilisation. Any calculation of a nitrogen optimum for a country with as much grass as the U.K. (nearly 20 million acres excluding rough grazings) must be very speculative, however expertly done. As grassland management improves, intensifying grass utilisation, so will the optimum rate for nitrogen increase. More silage-making, for example, means more nitrogen should be used. So—and especially for grassland countries like ours—these O.E.E.C. optimum of 1956-57 calculations must not be looked back upon as unchanging targets, certainly for nitrogen use.

It is both convenient and appropriate this year to concentrate a review of fertiliser progress on use, appropriate because unlike last year there have been few changes in manufacture. Two surveys about use deserve comment. One was a social survey among grassland farmers dealing with their attitudes towards new methods, including that of fertiliser use; though carried out in 1957 it was not reported until 1960. The other is not itself a survey, but is the first attempt to collate evidence from district surveys on fertiliser practice in Scotland.

Opinion Poll on Fertiliser Usage

The social survey must be regarded as guidance within the limitations of this kind of buyer-opinion 'polling'. Though by no means a small-scale survey, its 'sample' may not have been large enough to be nationally representative of grassland farmers in England and Wales. The districts for sample-surveying were chosen at random and in the writer's view too many were in arable areas, too few in dominantly grassland farming areas.

The social survey showed that 23% of grassland farmers used no fertilisers; another 17% used only basic slag and/or lime, i.e. no N or K; 60% used straights (other than slag) or compounds. However, of the 60% many farmers may have used fertilisers only on portions of their grassland; this seems certain as other surveys have shown that about 6 of every 10 grassland acres do not receive nitrogen. The non-users were asked why they ignored fertilisers; the collated replies are shown in the table at the top of the next page.

OPINION POLL OF GRASSLAND FARMERS

Reasons for non-fertiliser use	% of farmers
Unnecessary/land rich enough	30
Sufficient farm manure for use	19
Gave land plenty year before	14
Too costly/cannot afford fertilisers	7
Prejudices against fertilisers, e.g., starves the ground, fails to give good results	5

Reasons for not using 'twice as much'	% of farmers
Amount used enough/more not needed	50
Waste of money/could not afford it	15
Better to give small doses more often	11
Various answers indicating view that extra use would harm grass, animal health, etc.	13

With nitrogen it is unlikely that any previous year's supply has much effect currently and as this is the most important grassland nutrient, 56% of the reasons for non-use are in the class of technical misjudgment, ignorance, etc. If some non-users had enough farmyard manure, this cannot have been a sound judgment for all 19%. The users were asked why they had not used twice as much, an unfortunately weighted question as 'twice as much' is a steep increase; to have asked why they had not used half as much again might have been more revealing. The reasons given are shown in the table above.

There is a good deal of firm opinion that rates of use then existent (1957) were adequate; as this use can rarely have been near any optimum level, it would seem that many farmers, though using fertilisers on grass, have a limited view of the responses than can be obtained.

Choice of fertiliser was checked among a limited number of farmers. 49% chose on the basis of their own experience as against 24% making a choice on the basis of soil tests and 9% on the basis of advice (about equally for advice from the N.A.A.S. and from commercial firms). This implies a stronger influence for farmers' own judgment than for educational influences.

On the whole, the slowness with which fertiliser use has been expanding on grassland is well explained by this survey. There is a majority of the somewhat stubborn type of resistance (a) to using fertilisers at all, and (b) to increasing rates of use among actual users. The widely advocated views of scientists, advisers, etc., about grassland's high responses to fertilisers do not seem to have got through these outlook barriers with most farmers.

If, therefore, the sharp rise in use for 1959-60 is considerably accounted for by grassland use, there has at last been something like a break-through as the accumulated effect of educational efforts.

District practice surveys for Scotland have now been collectively stated, with the broad indications shown below.

These rates when given are not very different from scientifically assessed rates for maintaining and improving fertility and for appreciably improving grassland, so the indicated weakness in Scotland's practice lies with the non-dressed acreages, i.e., about 25% of the cereal acreage, about 60% of the grazed temporary grass, perhaps 25-30% of the cut temporary grass, and some 70% of the older grass. A resultant assessment of the *extra* fertiliser Scotland should use on her arable and grass acreage (4,400,000 acres) is nearly 12,000 tons of N; 17,000 tons of P_2O_5; and about 8,000 tons of K_2O. The gap would do doubt be greater if Scotland's major cereal was not oats, a crop of lower optimum demand for nutrients than wheat or barley. It should, perhaps, be pointed out that Scottish soils suffer more than English soils from phosphate fixation and deficiency so that crop responses to fertiliser phosphate are higher; Scotland needs to use twice as much phosphate per acre than is used in some districts of England. Treating this difference as exceptional, Scottish average use is exceeded only by some of the more advanced arable farming districts of England.

Even so, there remain excellent opportunities for expanded sales by the progressive Scottish section of the U.K. fertiliser industry.

Another survey about fertiliser use came from the U.S. and this, unusually, dealt with garden usage in New England. Overall, one in two householders used no fertilisers. The rating of kinds of garden use was highly significant, with lawns accounting for 57% of use, vegetables nearly 27%, flowers 11%. Only one-eighth of purchases were of organic type, including bulky products like dried manures and sewage sludges. Despite the traditional association between gardening and organic sources of foods, seven-eighths of purchases were of chemical type, and predominantly such fertilisers were compounds, only about 4% being straight or unmixed chemicals. We could profit from similar survey information for garden usage in Britain.

Non-farm use would seem higher in the U.S. than here, for New England used about 53,700 tons a year on gardens, or 10% of the area's total fertiliser usage.

The year has brought the usual number and miscellany of individual research papers. It is impossible for a broad review of this kind to do justice to these contributions, but attention can be drawn to a few. Use of liquid nitrogen fertilisers under British conditions was investigated and, in contrast with U.S. findings, it was concluded that liquid sources of N have no advantages over solid sources (H. R. Jameson, *J. Agric. Sci.*, 1959, **53**, 333).

Strong evidence for regarding cobalt as an essential trace nutrient for leguminous crops, e.g., clover, lucerne, has been put forward (H.M. Reisenhaur, *Nature*, 1960, **186**, 375 and S. Ahmed and H. J. Evans, *Soil Sci.*, 1960, **90**, 205). Sodium, given as salt, has been shown to be a yield-increasing nutrient for turnips and kale, appreciable yield gains being obtained (R. G. Hemingway, *J. Sci. Food and Agric.*, 1960, **11**, 349-362).

A new approach to curing manganese deficiency has been presented, placement of manganese sulphate with the seed row; this was more economic than foliar spraying but did not suffer from the severe defect of soil lock-up which usually makes broadcast dressings inefficient, (A. J. McGregor, E. K. Schofield-Parker and G. C. S. Wilson, *Fert. and Feed Stuffs J.*, 1960, **53**, 313).

The use of potassium bicarbonate for potatoes has been compared with that of potassium chloride and sulphate; it gave a slightly higher yield than sulphate, a usefully higher yield than chloride, but whether the advantage would be worth higher fertiliser cost is undecided by this work (A. Penny and F. V. Widdowson, *Rothamsted Ann. Rept*, 1959, 1960, **51**).

SUMMARY OF FERTILISER PRACTICE IN SCOTLAND

Crop	% of acreage receiving			Average rates given to fertilised acres (cwt. per acre)		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Cereals	73	78	73	0.27	0.45	0.33
Swedes, turnips	97	100	97	0.41	1.41	0.66
Potatoes	100	100	100	0.93	1.09	1.42
Sugar beet	100	100	100	1.20	1.26	1.58
Other tillage	81	86	84	0.61	0.97	0.90
Rotation grass:						
Grazed	38	39	34	0.29	0.67	0.41
Cut	81	64	58	0.41	0.65	0.46
Older grass, 5 or more years old	29	27	22	0.33	0.66	0.37

Chinese Menthol Crystals for U.K.

Menthol crystals are among goods for which U.K. import licences will be issued, on application, to the full value requested, under new arrangements for the licensing of imports from the Peoples' Republic of China during 1961.

Builders and Architects Take to Plastics for Wide Use Range

Foamed polystyrene boards supplied by Wola Products Ltd. being tacked in position as an insulator, prior to plastering.
[Photo by courtesy of Monsanto Chemicals Ltd.]

ABOUT 10 years ago, the possibilities of plastics were beginning to excite many people in Britain. This was especially true of those responsible for the forward planning of their industries, and there were many who indulged in over-enthusiastic crystal-gazing. "Plastics are going to change our whole lives," they said.

As we now know, plastics *have* come to play a very important part in our every day lives. However, the changes they have wrought have been far more gradual and subtle than the plastics prophets of a decade ago would have had us believe. Yet in the building industry their forecasts have not been quite so far removed from reality: the all-plastics house, for instance, has been built. Experimental plastics houses have proved that a "desirable residence" could be built using little else except plastics materials, and have served to show architects the possibilities which these new materials offered in building applications.

Everyday Uses

On a more prosaic level plastics have found their way into the building industry in more ways than is generally supposed. and it is apparent that architects and builders are at last considering plastics far more realistically than they did a few years ago. This article will try to show some of the applications that are already established and others that are still in the development stage.

In the construction of foundations, the liability of the deep section concrete base of the house to internal strains and cracking, is considerably lessened by placing thin, p.v.c. spacers between successive sections to allow microscopic movement between them without inducing stresses in the superstructure. Another method of achieving this is to place a layer of polyethylene film on top of one concrete section before pouring the next.

Polyethylene film is gaining wide acceptance as an ideal damp course material, its extremely low water permeability, making it excellent for the purpose, while affording considerable saving in cost over traditional materials. The same type of film is also used to make a temporary 'tent' over the entire working area so that building might go on during cold or rainy weather; further quantities are used to improve the surface finish of structural concrete pillars while retaining moisture during setting, by lining the shuttering moulds with film before pouring the concrete. The shuttering itself, is now often made from vacuum-formed moulds of high-impact polystyrene. Here again, the smooth surface of the plastic gives a good surface finish to the concrete.

The use of plastics pipes is now well established, and lightweight p.v.c. T-pieces. control taps and screw-on or adhesive joints are making the installation of cold water and ground drainage systems quick and trouble-free, while eliminating the hazard of internal scaling. With slight differences in installation methods, high or low density polyethylene may also be used, the choice of the materials depending on the particular requirements of the builder in terms of rigidity and expected water pressure. This type of piping will never corrode or contaminate the water it carries and the simple control valve, utilising polyethylene plugs, never bind or need washer replacements. Because of their resilience, plastics pipes do not burst if the water inside them freezes, while their flexibility allows them to absorb most vibration stresses and shocks and, incidentally, reduces the transmission of noise in piping systems.

Rigid p.v.c. sheets may also be used to form cold water storage tanks and lavatory cisterns while the ball-cock and entire system of accompanying pipework may now be made from high density polyethylene. Also attractively-coloured or white cisterns from high density polyethylene are on the market which resist the effects of frost and breakage. Up to now, plastics piping can only be recommended for cold-water systems, but much development work is being carried out to find a successful hot-water pipe, notably with polypropylene and a new type of high-temperature polyvinyl dichloride.

Freezing in interior cold-water systems may be prevented entirely by lagging with a comparatively new material, expanded polystyrene, a rigid foam combining extreme lightweight (as low as 1 lb./cu. ft.) with extreme ease of installation and possessing insulation properties better than cork. The same material is being used for roof and attic linings for under-floor thermal insulation. Panels of this material in a sandwich construction are now also being widely used for internal partitioning and doors.

Other miscellaneous uses for plastics in building are legion. P.v.c.-coated metal window frames are fast coming into use, while frames made completely of rigid p.v.c. are being developed. Guttering and down-pipes in p.v.c., high-density polyethylene or polypropylene

By

C. C. Gosselin, M.Sc.
Plastics and Rubbers Division, Shell Chemical Co. Ltd.

Hipact p.v.c. piping made by Extrudex Ltd., Bracknell, Berks, using Geon RA.170, is one-fifth the weight of steel, non-corrodible, shatter-proof and easily assembled. Uses include the supply and distribution of gas and potable water
[Photo by courtesy of British Geon Ltd.]

are also beginning to be used, and there is a big outlet for plastics in flooring. Parquet flooring can be bonded and protected by a lasting, glossy finish made from epoxy resins; p.v.c. is well established as a floor covering in the form of tiles or semi-rigid sheet and is successfully competing with other forms of floor covering. Folding doors and room-dividers in p.v.c., Perspex roof lights, polystyrene light fittings and switch-plates, urea-formaldehyde or phenolic switch-plates and electrical plugs, p.v.c. stair rails, p.v.c. fabrics, bath and sanitary fittings—the plastics list becomes almost endless.

One place where many of these applications are being gathered together for practical use under one roof is in the new Shell Centre being built on the South Bank, London. There, among many applications, some 22½ miles of piping and fittings, 70,000 square feet of p.v.c. flooring, 400 miles of cable, thousands of square feet of expanded polystyrene board and lagging and large quantities of Epikote resin-based paints are being used.

Looking to the future it is virtually impossible to assess a market potential for plastics in building with any degree of accuracy since the varied applications, the many sources of supply and the large number of companies producing finished products from the raw materials manufactured by several producers gives too complicated a picture to allow any assessment to be made that would not be out of date by the time it was completed. Nevertheless, within the rapid expansion of the plastics industry, building applications are showing that the trade is very willing to make use of these materials wherever their special attributes can be utilised to their best advantage.

Foamable polystyrene board prefabricated as heating ducting is being laid in foundations of a bungalow at Worthing. Board was supplied by Wola Products Ltd.

[Photo by courtesy of Hallmark Group and Monsanto Chemicals Ltd.]

Canadian Chemical Manufacturers Express Doubts as to Growth Prospects

UNCERTAINTY about the prospects for the Canadian chemical industry in 1961 is reflected in year-end comments by leaders of the industry. Thus, according to Mr. P. C. Allen, president of Canadian Industries Ltd., a more moderate sales advance is expected in 1961. "It is unlikely, for example, that the unusual expansion of chemical exports in 1960 will be repeated; sales will be tied more closely to the general economy of Canada."

On a more optimistic note, Mr. L. D. Smithers, president of Dow Chemical of Canada Ltd., feels that action by federal and provincial governments is likely to bring about a solution of present manufacturing problems, and states: "We are therefore of the opinion that the bottom of our decline has been reached, and that we will see a rising economy in 1961."

Mr. Robinson Ord, president of Canadian Chemical Co., feels that "There is no doubt that the growth pattern of the Canadian economy has slowed down, and I share the common view that we cannot expect much acceleration before the middle of 1961." Mr. A. A. Cumming, president of Union Carbide Canada Ltd., sums up the situation as follows: "Although long-term prospects are bright, most indicators point to our economy continuing in the contraction phase of the current business cycle through 1961, with employment stabilised at about today's levels. Some moderate price declines might reasonably be anticipated during the year."

Commenting on the current situation in rather broader terms, Mr. Leo E. Ryan, president of Monsanto Chemical Ltd., declares: "I am confident that our people, using their energy, enthusiasm and ingenuity, will cure the headache within the next few months. There are signs that the crisis is already past, and new health and vigorous growth lie before us."

The foregoing remarks were made in the context of other comments on current and future prospects for chemical manufacture, some salient points from which are as follows:

Mr. Allen (C.I.L.): The year 1960 was in many ways disappointing, although shipments of chemical and allied products approached $1,500 million for the first time. On the face of it, the increase in chemical output during the year compared favourably with the industry's average growth rate over the postwar period as there was little change in prices, but much of the improvement arose from export demand. Domestic consumption of chemicals increased only slightly, reflecting unsatisfactory economic conditions at home. Moreover, higher sales by the industry did not bring a corresponding increase in profits, although the performance of individual companies differed widely.

In 1960, the industry's outlays on new capital equipment rose by an estimated 50% to $115 mn., reversing the sharp decline of the previous year. Present information indicates that capital expenditures will continue at a high level in the year to come, with expansion of petrochemical plant in Western Canada again forming a big part of the investment programme.

Mr. Cumming (Union Carbide): With the close of the 1950's Canada ended 15 years of unprecedented growth. Now most of these growth areas have been partially saturated, suggesting more conservative rates of increase during the next ten years.

Improvement should come when demand catches up with production capabilities resulting from recent large-scale expansions, thus necessitating further capital investment in new plants and facilities. To accelerate the process, new export customers for our manufactures must be vigorously sought out to replace those lost through rapid industrialisation in many traditional overseas markets.

Mr. Ord (Canadian Chemical): Our domestic sales are not growing at the previous rate, but neither are they declining. Our export sales, which account for more than half our business, continue to grow, and we anticipate still further growth in 1961. Because of rising costs and increasing competition, we do not expect net profit to increase at the same rate as sales.

The current business decline should be mild, and in all probability will have spent its force by the middle of next year. Fortunately, industry is not faced with large inventory reductions, as management has been able for the most part to avoid those excesses in buying and pricing policies which would have intensified succeeding re-adjustments.

New Chemistry and Chemical Technology Buildings at Glasgow

A SEVEN-STOREY chemistry block, fronting Cathedral Street, and a three-storey chemical technology block fronting John Street are included in plans for a big building development for the Royal College of Science and Technology, Glasgow, which have been approved by the Glasgow Corporation planning authorities. The building project also involves an eight-storey extension to the new engineering block, fronting Montrose Street.

The first two floors of the chemistry block will be devoted to chemical technology and the remaining five floors to chemistry; the three-storey block will be devoted partly to chemical technology and partly to chemical engineering; the extension to the engineering block will contain several large laboratories, lecture rooms, and drawing offices.

Project News

C.J.B. Get Main Contract for Major C.C.F. Fertiliser Plant

MAIN contractors for the major fertiliser plant that **Richardsons Chemical Manure Co. Ltd.** plan to have on stream in 1962 at Belfast are **Constructors John Brown Ltd.**, the contract having recently been signed. The plant will produce concentrated complete fertilisers and capacity will be sufficient to supply Northern Ireland's needs in C.C.F. for some years to come. No details are available.

I.C.I. acquired a 51% holding in Richardsons and Ulster Manure Co. Ltd. from W. and H. M. Goulding Ltd. last February. Richardsons and Ulster Manure have plants at Belfast and Londonderry and both now have full technical service backing from the I.C.I. Billingham Division and the Jealott's Hill Research Station.

Goulding completed a £2 million project at Cork during 1960; this includes a 70,000 tons/year Simon-Carves sulphuric acid plant, plus capacity for 200,000 tons/year superphosphates and compound fertilisers. Due in production by the middle of this year is a 200 tons/day Simon-Carves sulphuric acid plant at Dublin.

1st-stage Monsanto Polythene Expansion will Boost Capacity to 25,000 T.P.A.

● POLYTHENE production capacity is to be substantially increased at the Fawley, Southampton, site of **Monsanto Chemicals Ltd.** The first stage, which will add about 50% to the present capacity of 17,000 tons/year, will be fully in operation early in 1963. The layout of the plant will facilitate the addition of further units as the market develops.

This is the second expansion to the Fawley plant, which uses the high-pressure process. The plant was originally commissioned in the spring of 1959 with a capacity of 10,000 tons/year; during 1959-60 capacity was raised to 17,000 tons.

By the end of this year, U.K. capacity for polythene will exceed 165,000 tons/year, rising with the Monsanto addition to 175,000 tons by 1963 (see also p. 95).

Further £3½m. Pemex Contracts for U.K.

● A SECOND financing agreement, allowing for the purchase of £3½ m. worth of petroleum refinery equipment from the U.K. for the Mexican projects of Petroleos Mexicanos (Pemex) has been entered into and ratified with Pemex by **British Oil Equipment Credits Ltd.** A subsidiary of the Council of British Manufacturers of Petroleum Equipment, B.O.E.C. is a credit company set up as a non-profit making vehicle for organising turn-key credits working closely with the Export Credits Guarantee Department (E.C.G.D.). Pemex are the company's first and only customer to date.

The new agreement is a follow-up to the first contract, also involving £3½ m. worth of credits, in connection with which considerable quantities of refinery equipment have already been shipped to Mexico by C.B.M.P.E. members.

Mobil to Expand Refining Capacity at Coryton

● CONTRACT for a crude topping unit as part of a programme to expand the refining capacity at Coryton, Essex, of **Mobil Oil Co.** has been awarded to **Kellogg International Corporation.** The new unit, which has been designed for an initial throughput of 15,000 barrels/day, will be readily capable of further expansion. It will process low-sulphur crude; on stream time is early 1962.

Rhodesia Coke Oven Order for Powell Duffryn-Coppee

● A CONTRACT has been awarded to **Powel Duffryn-Coppee** for a battery of 25 coke ovens and ancillary plant for the Rhodesian Iron and Steel Co.'s steel works at Redcliff, Southern Rhodesia.

Powell Duffryn-Coppee have recently completed a contract for Rhodesian Iron and Steel for the supply of a complete coal preparation plant, coke ovens and an associated by-products plant. The original 25 coke ovens were designed to produce 125,000 short tons of coke annually and the new order, worth over £500,000, will double this output.

Cooling Water Pump for Fawley Refinery

● FOSTER WHEELER LTD. have placed an order with **W. H. Allen Sons and Co.**, Bedford, for a 36/34-inch horizontal-spindle, double-suction cooling-water pump for Esso Petroleum Co. at Fawley refinery.

The pump will be constructed in bronze to pass 33,000 U.S. gall./min. against a total head of 212 ft. It will be motor driven.

N.C.B. Place Orders for Naphthalene Plants

● THE National Coal Board has placed two orders with **International-Carl Still Ltd.**, 19 Woburn Place, London W.C.1, in connection with the production of naphthalene.

The plant for the N.C.B. South Western Division will be erected at Caerphilly Tar Distillation Works and will operate in conjunction with the existing continuous tar stills; this will be capable of refining all the naphthalene recovered (84.5%) to phthalic grade material. The process used, under licence,

(*Continued in page 100*)

Evans Medical Recommend Acceptance of Glaxo Bid

COUNTER-BID to that made by Fisons Ltd. for Evans Medical Ltd. has been entered by Glaxo Laboratories, whose offer is worth £8.4 million, compared with £6.75 million from Fisons. Directors of Evans Medical, who advised their shareholders to take no action on the Fisons bid pending consideration by the board, intend to recommend acceptance of the Glaxo offer.

An early statement was at the time of going to Press expected from Fisons whose directors met on Monday to consider the Glaxo intervention.

As stated last week, p. 20, the Fisons terms were one £1 share plus 30s cash for every three of Evans 5.2 million 5s ordinary shares and a four-for-three share exchange into Fisons' 4½% preference, plus 1s a share in cash, for holders of Evans 6% preference stock. The Glaxo terms are two Glaxo 6% cumulative preference 10s units plus 1s in cash for each £1 6% cumulative preference stock in Evans Medical; and one Glaxo 10s ordinary for every two 5s ordinary in Evans Medical.

The Fisons bid values Evans Medical on a 5% earnings yield, with a cash consideration included; the Glaxo bid values the earnings yield at 4%.

If the Glaxo offer for the ordinary stock becomes unconditional, Evans Medical holders will receive a special 10% interim dividend for 1960 in lieu of the final.

Another Bid is Made for Howards

ANOTHER company is making a bid for Howards and Sons Ltd., of Ilford. In a letter to the shareholders, Mr. T. W. Howard, chairman, revealed that detailed investigations are now in progress and will be carried through as soon as possible. It is understood that the offer, if made, will be in the form of an exchange of shares, but it is unlikely that it will be for several weeks.

A takeover bid for Howards was made in August (see CHEMICAL AGE, 13 August 1960, p. 235) by an unnamed company. Rumours that Fisons were involved were denied. Fisons' name has also been linked with the present takeover but they have again denied being involved. Fisons' at present are engaged in an offer for Evans Medical.

Chemicals in 1961

(*Continued from page 79*)

caution. While planning expansion schemes, they look to 1961 to produce a home and export sales increase of 9%.

It is perhaps the export outlook that calls for most concern, statistics for the first 11 months of 1960 showing that our overseas chemical shipments were higher by 8.6%, but that imports rose by more than 30%.

Petrochemical Feedstock Supplies Higher by 48% Last Year

(*Continued from page 82*)

an even higher consumption of fertiliser, particularly compounds for which a rise of 4% is expected.

U.K. total nitrogen production in the year 1959-60 was 530,000 tons N, which is expected to rise to 620,000 tons N in 1960-61.

Fertiliser firms returning the C.A. form were insufficient for inclusion in this survey.

U.K. production and deliveries of fertilisers are shown in the following tables, based on official statistics (weight is in content of P_2O_5, N and K_2O):

PRODUCTION

	1959-60*	1958-59	1957-58
	Monthly averages, '000 tons		
P_2O_5 total	33.2	30.9	29.1
Single superphosphate	11.5	12.6	13.0
Basic slag	8.8	6.9	6.8
Nitrogen	32.9	29.2	28.5

HOME DELIVERIES

	1959-60*	1958-59	1957-58
	Monthly averages, '000 tons		
P_2O_5	39.8	32.1	32.2
N	34.6	28.4	25.8
N for export† ...	4.3	4.0	5.3
K_2O	36.4	31.3	29.0
Liming materials ...	640.1	507.4	565.7

COMPOUNDS

	1959-60*	1958-59	1957-58
	Monthly averages, '000 tons		
Compound fertilisers‡			
Production	233.9	209.4	193.8
Home deliveries ...	239.6	203.5	199.0

* Based on first eight months.
† Inc. ammonium sulphate for non-farm use.
‡ Total weight; double counting is avoided in these tables.

Biggest Ever Increase

● **Petrochemicals.** Deliveries of petroleum as petrochemical feedstock in the first nine months of 1960 rose 48.2%, the highest-ever increase. Deliveries in 1954 totalled 607,200 tons, rising to 793,200 tons by 1957. The 1959 total of 1,066,800 tons was exceeded in the first nine months of 1960 when the figure was 1,172,700 tons—a monthly average of 130,300 tons, compared with a 1959 monthly average of 88,900 tons.

By the end of 1960, U.K. petrochemicals investment totalled some £140 million, of which £65 million was invested in 1959 and 1960. New olefin capacity was brought in during 1960 with commissioning of British Hydrocarbon Chemical's third unit at Grangemouth and by modifications to I.C.I.'s Wilton installations raised ethylene capacity by 25%.

B.H.C., with olefin capacity of 330,000 tons/year, will in 1961 double their butadiene capacity and can be expected to announce new petrochemical plants for Llandarcy. Esso will be on stream this year with more ethylene, propylene and butadiene, ethylene to be piped to I.C.I. Severnside for conversion to 35,000 tons/year of ethylene oxide, glycol, etc. In 1960 I.C.I. brought new plant on stream for propylene oxide and glycol, following raising of Wilton propylene output to 80,000 tons/year. Shell came on stream in 1960 with a new direct oxidation ethylene plant, while Union Carbide also have a new ethylene oxide, glycol and derivatives plant at Hythe. Forth Chemicals will have 50,000 tons/year styrene capacity by mid-1961, and by 1963 will double this with a new monomer plant at the B.P. refinery at Llandarcy.

Slow-down in Plastics

● **Plastics Materials.** Although U.K. sales of plastics materials declined from 143,000 tons in the second quarter of 1960 to 127,800 tons in the third quarter —a drop of 12%—U.K. consumption during the first nine months was some 24% up on the same period last year, with a much higher rate of increase at the beginning of the year. Sales in the first nine months of 1960 were up 15% on the same period of 1959; sales of thermosetting materials were up 13.6%, while sales of thermoplastics rose by 16.3%.

Exports increased in the first 10 months by 9.9%, compared with a rise in the first 10 months of 1959 over the same period of 1958 of 26.9%. In the first 10 months of last year exports of acrylics rose 12.3%, with shipments of alkyds up by 27.5%, aminoplastics higher by 10.3%, polythene by 11.4% and p.v.c. by 13%. Exports of polystyrene were 13.1% below the figure for the first 10 months of 1959.

In the plastics field, British Geon are to bring more p.v.c. capacity on stream in 1961 and have announced plans for a further extension. I.C.I. will by mid-1961 raise p.v.c. capacity by 10,000 tons to 80,000 tons; by 1962 the U.K. should have capacity for some 130,000 tons/year.

In the polyolefins field, I.C.I. now have a 11,000 tons/year polypropylene plant and are planning expansions; Shell during 1961 will be on stream with 30,000 tons/year capacity for polypropylene, and both Ziegler high-density and B.A.S.F. low-density polythene. By end-1961 U.K. polypropylene output should be at a 20,000 tons/year level, with polythene touching the 165,000 tons/year mark. In 1960, I.C.I. raised polythene capacity to 105,000 tons, Monsanto to 17,000 tons and Union Carbide to 13,000 tons.

Big plans are also in hand for nylon 6 —I.C.I. planning a 15,000 tons/year plant. British Enka and Courtaulds are also thought likely to enter this field. Following increase to their foamable polystyrene plant in 1960, Monsanto have plans to raise output of impact polystyrene. In 1961, I.C.I. will be the first U.K. producers of polyvinylidene chloride copolymers.

In the C.A. survey, producers of synthetic resins and plasticisers reported that total sales were up last year by an average of 12.1%, with exports higher by 6.7%. This year sales are expected to increase by 10.2%. Of the firms replying, 78% attributed higher sales to the extension of facilities, while 74% had introduced products in the past five years. Just over half reported that sales drives had been intensified.

In the plasticiser field, I.C.I. are to raise production at Billingham of carbonylation alcohols to 140,000 tons/year by 1962.

Spending rose by 2.4% on replacements, 1.1% on extensions, 6.2% on new plant and 3.3% on research and development. Half of the firms replying plan extensions to existing works, while 76.7% will build new plants.

72% of the firms believe that a free trade merger in Europe would benefit their sales; 25% would not be interested in any links, either on sales or production, in Europe, but more than half would consider setting up production units on the Continent.

Spurt for Pesticides

● **Pest Control Products.** Sales in this category rose last year by an average 16.2%, with exports higher by 3.7%. This year, a rise in home and export sales of 5% is looked for. Of the firms replying, 64.6% attributed higher sales to extended facilities, while more than 90% acknowledge the value of products added to selling ranges since 1955.

Capital spending rose as follows: 3% on replacements, 5.5% on extensions, 4.1% on new plant and 3% on research and development. Extensions are planned by 75% of companies replying and entirely new plants by 30%. Some 80% of the companies would welcome a free trade merger; there is no interest in setting up production units on the Continent and very little interest in either sales or production links.

Drug Research Spending Up

● **Pharmaceuticals.** Producers of pharmaceuticals reported a 1960 sales rise of 12.5%, with exports up by an average of 8.8% (compared with an official figure of 8.05%). For 1961, turnovers will rise by an estimated 8.6%. Only one company reported a decline in 1960 total sales, but 28% of the firms replying reported declines in exports, ranging from one of 62.5% to one of 3%.

Increased sales were attributed to extended facilities by 18.1% of the companies to post-1955 products by 54.5%, and to more intensive sales efforts by 72.7% (one company stated that it had recovered markets previously lost).

Capital spending was up by an average 7.7% on replacements, by 0.78% on extensions, and by 9.4% on new plant. As was to be expected in this field a big increase, 15.2%, was registered for research and development. Some 65% of the firms are planning extensions and 32.4% will build new plants.

A merger of the 'Sixes and Sevens' would be welcomed by 41.6% of the firms replying, while 17.8% are doubtful

as to its benefits; 18.1% would be interested in sales links with European companies (16.5% already have such links) and 9.9% are seeking production tie-ups, which a number of the companies already have. Only 9.1% of pharmaceutical firms are interested in setting up subsidiaries on the Continent and one firm already has such a venture.

Official statistics show that exports of drugs, medicines, etc., valued at £35.68 million for the first 10 months of 1960, were 8% higher than a year earlier (this compares with a first 10 months of 1959 rise of 5.6% over 1958). Exports of antibiotics, valued at £8.3 million, were up 6.8%, compared with a decline registered in 1959 over 1958. Production of penicillin in the first nine months of last year showed a rise of 3.6% over the previous year.

Free Trade Favoured

● **Other Fine Chemicals.** Sales last year were higher by 24.9% on average, with exports higher by 15%. For 1961 firms in this field look for a rise of 15.1% in home and export sales. Of the many companies replying under this heading, there were fewer fluctuations in either 1960 results or in 1961 estimates; one notable exception—which showed 1960 sales up by nearly 200%—has not been taken into account.

Higher sales were attributed to extended facilities by 61.1% of companies replying, to post-1955 products by 58.3% and to greater sales efforts by 95.6%. Just over 90% of the companies have plans for extensions, while 78% have new projects in mind.

Investment spending was up by 3.7% on replacements, by 4.7% on extensions, by 5.7% on new plant and by 12.5% on research and development. Great majority of those replying (81%) favour a trade-bloc merger; more than half look for sales tie-ups and less than one-quarter would like joint production ventures. A small number of companies already have Continental links as well as production subsidiaries in Europe.

New Plant Projects

● **Coal Tar Products.** Total sales last year are shown to have risen by an average of 6.3%, with exports higher by 5.9% and a 1961 sales increase of 4.1% estimated. Of the companies replying, just over 70% reported that they were planning extensions to existing plant while 62% have new projects planned. Little change in investment spending is reported, except in the case of research and development, where there was an average rise of 1.75%.

Under 30% of firms replying would welcome a wider free trade area in Europe; there is little interest in links with continental companies, but a number of firms would like to establish their own production in Europe.

A review of U.K. trends in benzole appears in p. 85. Gas industry production figures for 1959-60 were as follows: crude coal tar, 1.7 million gall. (1.6 million), plus 400,000 tons of refined tar; crude oil gas tar, 79,000 tons (93,000); crude benzole, 24.4 million gall. (25.2 million); refined benzole, 11.2 million gall. (11.3 million); spent oxide, 232,000 tons (227,000 tons); ammoniacal liquor (sales), 75.9 million gall. (59.1 million).

10% Sales Rise Again

● **Dyestuffs, Intermediates.** Sales performance was on similar lines to that reported in the last C.A. survey. Total sales last year rose by an average of 10.0% (compared with a 10.1% rise in 1959 sales), while exports were higher by an average 16.7% (1959 rise was 15.5%). For the first ten months of 1960, exports of dyestuffs rose by an average 18.7% compared with the same period of 1959. Producers expect that 1961 will produce an average sales rise of 10.0%.

None of the firms replying attributes higher sales to special sales drives, but all acknowledge an extension to facilities. A little over 70% plan further extensions and 26% have plans for new projects. Investment spending was high in this field, with increases as follows: replacements, up to 8.9%; extensions, up 7.5%; new plant, up 9.2%; research and development, up 6.9%.

There is little support for a merger of the 'Six' and 'Seven' and only one company registered any interest in links with European companies.

Board of Trade statistics show that U.K. production of synthetic dyestuffs (excluding synthetic organic pigments and intermediates) in the first half of 1960 rose by 10% compared with 1959. January-June output totalled 16,010 tons, making a quarterly average of 8,000 tons, compared with a 1960 quarterly average of 7,260 tons.

U.S. Sulphur Industry Achieved Record Exports in 1960

INCREASED shipments abroad for the third consecutive year and a new export record has been achieved by the U.S. sulphur industry in 1960. In an annual review Mr. Charles A. Wight, president of Freeport Sulphur Co., said that Free World demand increased as a result of the high rate of industrial activity. Sulphur, considered a barometer of business activity, is used in the manufacture of fertilisers, chemicals, paper, steel, rubber, textiles and many other products.

Preliminary data indicates that exports of sulphur would total 1,700,000 tons, an increase of 100,000 tons over 1959. The new record was achieved despite an increase of 600,000 tons in the shipments of other producers supplying the overseas markets.

Major importing countries of U.S. sulphur and the estimated tonnage shipped were: U.K. 310,000 tons; Canada, 300,000 tons; Australia, 140,000 tons; India, 140,000 tons; and Brazil, 130,000 tons. All sales of U.S. sulphur outside the North American continent are handled by the Sulphur Export Corp., which is jointly owned by the four major U.S. Frasch sulphur producers.

In the U.S. consumption of sulphur in all forms also reached record levels. Domestic use was estimated to be in excess of the previous highest consumption of 5,950,000 tons in 1959. The phosphate fertiliser industry, which had a record year, was a particularly strong factor in the sulphur market.

Domestic sulphur production was up about 7%. Output from all sources amounted to an estimated 6,600,000 tons, compared with 6,165,000 tons in 1959. Of the total, an estimated 4,950,000 tons was elemental sulphur mined by the Frasch hot-water process from salt dome deposits along the coast of Louisiana and Texas. Of the balance, 725,000 tons represented elemental sulphur recovered from sour natural gas and refinery gases; 425,000 tons sulphur contained in pyrites; and 500,000 tons sulphur in various forms from other sources.

During the year, three new Frasch mines came into operation on the U.S. Gulf Coast. The largest new mine was Freeport's Grand Isle project, situated seven miles off the shore of Louisiana in 50 ft. of water. This gain in productive capacity was partially offset by the announced closing of two other mines, one in Louisiana and one in Texas.

Modern Chemical Industry in Great Britain

A series of lecturers on 'The modern chemical industry in Great Britain' is to be given at the Royal Society of Arts, John Adam Street, Adelphi, London W.C.2, by James Taylor, a director of Imperial Chemical Industries. The lectures, on 23, 30 January and 6 February 1961, will be as follows: 'Towards a philosophy of the modern chemical industry'; 'The springs of progress'; and 'The modern chemical industry in Great Britain'. Applications for tickets should be made to the Secretary of the Society.

I.Chem.E. to Form New South Eastern Branch

Inaugural meeting of the South Eastern Branch, Institution of Chemical Engineers, will be held at the Geological Society, Piccadilly, London W.1, at 3.30 p.m. on 24 January. The meeting is open to corporate members. The new branch will for the time being cover an area comprising: London, Beds, Berks, Bucks, Cambridgeshire, Essex, Hants, Herts, Hunts, Kent, Middlesex, Norfolk, Oxfordshire, Suffolk, Surrey and Sussex.

AMBERLITE 200

a NEW ion exchange resin

Photograph shows bead form of AMBERLITE 200

designed for durability under aggressive conditions

AMBERLITE 200 represents an entirely new concept in polymer chemistry. A high capacity, strongly acidic cation exchange resin, AMBERLITE 200 has physical and chemical stability unmatched by any available cation exchange resin. Outstanding features of AMBERLITE 200 include . . . high resistance to oxidation, especially in water containing chlorine, oxygen and metals such as iron, copper and manganese; perfect bead form; high attrition resistance; stability over the entire pH range; insolubility in all common solvents.

In water treatment in either hydrogen or sodium cycle operation, the exceptional bead characteristics of AMBERLITE 200 make possible more rapid and complete bed classification, low losses from mechanical attrition, and greater freedom from bead fracture caused by thermal and osmotic shock. For example, 2,000 regeneration-exhaustion cycles using saturated brine and calcium chloride showed no measurable resin breakdown, whereas, conventional cation exchange resins showed failure of from 20 to 75%.

Write for full information on AMBERLITE 200 and for our booklet "IF YOU USE WATER" to:—

Chemicals for Industry

CHARLES LENNIG & COMPANY (GREAT BRITAIN) LTD

26/28 BEDFORD ROW, LONDON W.C.1. Tel: CHAncery 6631 (7 lines)

Manufacturing Subsidiary of Rohm & Haas Company, Philadelphia.

AP45

I.C.I. METHYL METHACRYLATE KNOW-HOW FOR CYANAMID

KNOW-HOW on methyl methacrylate production developed by Imperial Chemical Industries Ltd. goes to American Cyanamid Co. under a new agreement between the two companies which gives Cyanamid manufacturing rights in the U.S. The agreement covers know-how in the fields of monomer, cast sheet, moulding materials, and methods of converting these products into finished articles.

Cyanamid are leading producers of melamine and urea thermosetting resins for the plastics industry and have recently shown an interest in the possible production of methacrylates. As producers of acrylonitrile they manufacture hydrocyanic acid, a principal raw material in methyl methacrylate production. The U.S. is at present faced with overcapacity for acrylonitrile, so that production of methyl methacrylate would give Cyanamid an alternative use for their hydrocyanic acid. There are at present only two U.S. producers of methacrylates—Du Pont and Rohm and Haas—but Escambia Chemical (New York) have plans to build a plant, which will use a new process starting with isobutylene and nitric acid.

I.C.I. have for many years marketed methyl methacrylate sheet throughout the world under their trade name, Perspex. There was a record output of Perspex at I.C.I. Plastics Division's Tees-side works in 1960, being almost 50% more than the previous year's total. Perspex is widely used for advertising signs, lighting fittings, and roof lights.

I.C.I.'s moulding material, Diakon, is used for motor-car rear lights, telephones, and many components of the radio and television industries, including implosion guards.

Shell Cut Prices of Polythene, Polypropylene

PRICE reductions, for high density polythene and polypropylene plastics raw materials, to take effect immediately, have been announced by Shell Chemical Co. Carlona high density polythene comes down from 2s 8½d to 2s 6d or 2s 7d/lb., depending on the grade. Carlona polypropylene is reduced from 3s 4½d to 3s 1d/lb.

The company also announces the introduction of Carlona low density polythene at 1s 10d/lb. which will be imported from a joint Shell/B.A.S.F. company in Germany until the 30,000 tons plant for producing high and low density polythenes and polypropylene at Carrington, near Manchester, comes into operation later this year. Shell Chemical claim to be the first U.K. company able to offer a complete range of polyolefin raw materials.

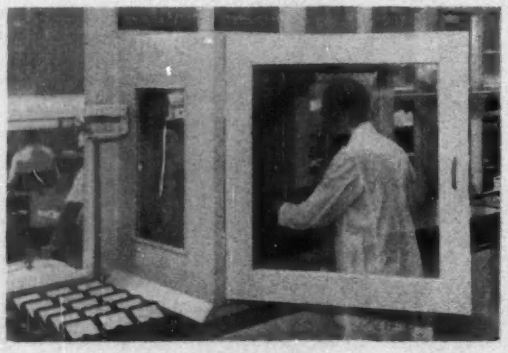
Monsanto Cut Polyflex Film and Sheet Prices

PRICE reductions of approximately 20% in the range of Polyflex 150 packaging film and Polyflex 100 sheet are announced by Monsanto Chemicals Ltd., who market this clear, biaxially-oriented polystyrene in the U.K. The reductions have been made possible by a substantial increase in the volume of sales, coupled with improved manufacturing costs.

Polyflex 150 is available in four gauges —.001, .00125, .0015 and .002 in. Its new price of 6s/lb. provides film at a cost of from .403d to .806d/sq. ft. Polyflex 100 is available in gauges .005, .0075, .010, .015 and .02 in., in standard roll widths of 42 and 21 in.

Principal uses of Polyflex 100 are for fabricated and thermo-formed thin wall containers and closures. Polyflex 150 is particularly suitable for over-wrapping.

Sifam Open Dust-free Instrument Factory at Torquay



Electrically interlocked double hatches having slight outward pressure are used for the transfer of instrument parts from the 'semi-clean' to the 'clean' area at the new factory of Sifam Electrical Instrument Co. Ltd., Woodland Road, Torquay, Devon. The factory, designed for the manufacture of electrical measuring instruments and pyrometers, carries out development work

Who Owns Whom in the British Chemical Industry

Structure of the British chemical industry is the subject of a new feature in the 1961 edition of the "Chemical Age Directory and Who's Who." This lists the names of parent companies, indicates whether they are of British or overseas origin, and gives the names of subsidiaries and affiliated companies that operate in the chemical industry of this country.

Remaining sections of the Directory have been revised and substantially extended; the 1961 edition containing 20 more pages than the 1960 edition. A 76-page "Who's Who of the Chemical Industry" gives details of more than 4,000 leading personalities. Other editorial features : lists of names and addresses of trade associations, learned societies, etc., Government Departments, chemical sections of Government Departments and State undertakings, U.K. research organisations, chemistry teaching facilities at Universities, etc.

The Buyer's Guide contains more than 4,000 product headings in two sections—chemicals and plant and equipment—an invaluable reference source both to buyers and sellers. This feature is cross-referenced to a Master Index giving the names and addresses of 1,700 companies, with telephone numbers, etc.

Copies are priced at £1 1s. to subscribers (£2 2s to others) and can be reserved by writing to the Manager, "Chemical Age," 154 Fleet Street, London E.C.4.

Obituary

Mr. Cecil John Turrell Cronshaw, who died on 5 January, aged 71, was a former director of I.C.I. and a former deputy chairman of British Nylon Spinners. He played a distinguished role in the revival of the British chemical industry after World War I. At the end of the war he was chemical controller in the U.K. occupation zone and was successful in bringing back to this country many of the dyestuffs techniques which had been lost to Germany. He became managing director of I.C.I.'s dyestuffs interests in 1931. From 1939 to 1943 he was a director (delegate) of I.C.I. General Chemicals Division. He was president of the Society of Dyers and Colourists from 1939 to 1946.

Mr. E. F. Watson, who died recently following a road accident (aged 57), was a director of Efco Furnaces Ltd., having joined the company in 1933. He was for many years sales manager and was appointed to the board in 1955.

Changes in I.C.I. Akers Research Lab.

CHANGES in the administration and organisation of their Akers Research Laboratory are to be made by Imperial Chemical Industries Ltd. This laboratory, located near Welwyn, was established 15 years ago to conduct general long range and fundamental research. Hitherto it has been administered centrally.

Its work will now be associated more closely with the research carried out by I.C.I. manufacturing divisions. To this end the two main activities of the laboratory—research on microbiology (with the associated research in organic chemistry) and in inorganic chemistry—will, in future, be the responsibility of the Pharmaceuticals and Heavy Organic Chemicals Divisions respectively. Dr. P. W. Brian, F.R.S., who becomes an associate research manager of the Pharmaceuticals Division, will have charge of the work for this division, and will also be in general charge of the laboratory.

Dr. J. Chatt will continue in charge of the inorganic chemistry department, and is appointed group manager of the Heavy Organic Chemicals Division.

The laboratory will continue to be a centre for exploratory research in the selected fields. While the type and general character of the laboratory work will be unchanged, it will be more aligned to the long term interests of the company. The new organisation should facilitate the industrial development by other units of I.C.I. of new knowledge gained in the Akers Laboratory.

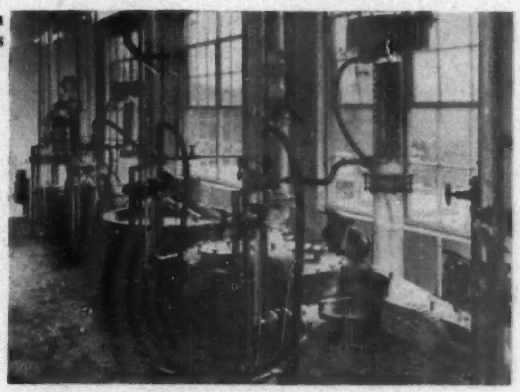
New Multiwall Paper Sack Firm at Hull

BY March Europe's most modern multiwall sack factory will be in full production on a site in Hull that was vacant only seven months ago. Detailed planning plus the use of road trailers to transport paper-converting machinery in pre-assembled sections has enabled Papropack Ltd. to halve the usual gap between erection and production.

Joint owners of Papropack are W. Rosenlew and Co. A.B., paper and pulp makers, of Finland, Mid Wynd Holding Co. Ltd., Robertson Industrial Textiles Ltd. and Thos. Boag and Co. Ltd. The British companies will provide a technical sales force operating from 25 offices and depots throughout the U.K.; sales companies are Unijute Ltd. and Scott Boag Papers Sales Ltd.

Fawley Polythene Factory Wins Monsanto 'Housekeeping' Trophy

The annually awarded chairman's Good Housekeeping Trophy of Monsanto Chemicals Ltd. has been won for 1960 by the company's polythene factory at Fawley. In presenting the cup to the factory the chairman, Sir Miles Thomas, made it clear that Fawley—a new factory using an exceptionally clean manufacturing process—was for these reasons severely handicapped by the inspecting committee.



Stainless steel reaction vessels and glass condensers

£15,000 Nickel Brighteners Plant for Electro-Chemical Opened at Woking

BUILT at a cost of some £15,000, a plant which produces organic raw materials for six of their nickel brighteners has been brought into production by Electro-Chemical Engineering Co. Ltd. of Sheerwater, Woking, Surrey. The plant has a maximum capacity of 8,000 gall./week of nickel brighteners—sufficient to deposit 2 million lb. weight of bright nickel plate per week.

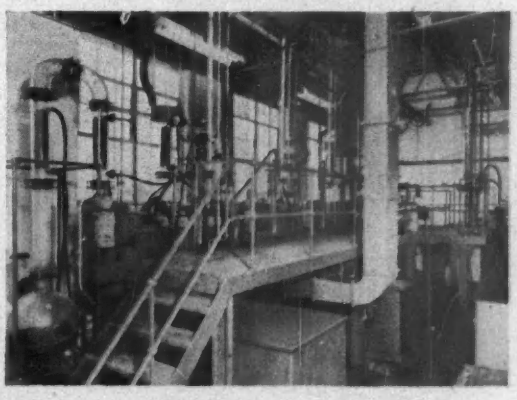
The brighteners are manufactured in batches from readily available raw materials in stainless steel jacketed reaction vessels which are fitted with glass condensers for reflux distillation operations. On completion of the reaction, the crude products pass into rubber lined purification tanks where they are treated, purified and then filtered to the intermediate storage tanks. The brighteners are then held in the intermediate storage tanks until they have been approved by laboratory analysis and plating tests, after which they are pumped to 8,000 gall. bulk storage tanks. When required, they are then pumped to further storage tanks from where they are dispensed into containers for despatch to customers.

The plant is housed in a new building designed by Campbell Gifford and Morton Ltd., who were the consulting engineers for the whole project. The building, attached to the main factory, is constructed of brick and has acid-resistant flooring, while the internal walls are glazed to a height of 8 ft. A comprehensive fume extraction system has been installed and removes noxious fumes from the tops of all condensers, vessel openings and purification tanks. As inflammable raw materials are used, all the electrical equipment and fittings are of a flameproof type.

Suppliers of plant and equipment included T. Giusti and Son Ltd. (stainless steel reaction vessels), Q.V.F. Ltd. (glass condensers), Nordac Ltd. (Vulcoferran lined tanks and pipework), Buchanan and Curwen Ltd. (electrical contractors), Prodorite Ltd. (acid resistant tiles), and A. Smith and Sons (steam, water and air services).

Anchor Chemicals

Established in 1892 with the primary purpose of manufacturing and supplying chemicals to the rubber industry, Anchor Chemical Co. Ltd., Clayton, Manchester 11, have since then increased their range of products to serve that industry extensively and, at the same time, the paint, printing ink and paper industries. The company have now issued a 40-page brochure describing their range of chemicals and their applications.



Reaction vessels in the organic chemicals manufacturing plant

Chemical Careers Convention a Success, say Masters

Sir Miles Thomas, chairman, Monsanto Chemicals, talks on 'An introduction to the chemical industry'. Centre is F. H. Braybrook, director, Shell International Chemical Co., responsible for organising the convention, and, right, Sir Owen Wansbrough-Jones, director in charge of research, Albright and Wilson

THE most interesting convention yet held was the verdict of Mr. Hugh Lyon, director Public Schools Appointments Bureau, on the careers convention held in London last week with eight chemical companies as hosts (see also C.A., last week, p. 7). Mr. Lyon was speaking at the convention dinner held in Grosvenor House on 5 January.

Mr. W. F. Mitchell, a director of Shell International Chemical, who presided, spoke of present-day needs of the chemical industry for chemists with a background of physics and engineering, rather than chemists who had also studied biology.

Trends in Government science was the subject of a talk by Sir Harry Melville, secretary, Department of Scientific and Industrial Research, who spoke of ever-mounting calls on State funds, notably from radio-astronomists and nuclear physicists whose equipment was extremely expensive. The next few years might well see Government grants rising to £100 million a year, not far behind the expenditure of the whole of British industry, £150 million. There would then be the serious problem of balancing the effort made in pure science with that for applied science.

C. F. Kearton, managing director, Courtaulds, addressing the convention. With him is N. A. Iliff, managing director, Shell Chemical Co.

Sir Alexander Fleck, president, Society of Chemical Industry, made the point that the industry not only sought the brilliant students, but also the not-so brilliant, for whom companies could provide a good and interesting future.

Guests at the dinner also included Sir Alexander Todd, president, Chemical Society, and Mr. E. LeQ. Herbert, president, Royal Institute of Chemistry. The host firms—Albright and Wilson, Courtaulds, Distillers, Fisons, I.C.I., Monsanto, Shell Chemical and Shell International Chemical—were well represented by directors and other senior executives.

Orders for Two N.C.B. Naphthalene Plants

(*Continued from page 94*)

will be that developed by Ruetgerswerke A.G., Germany, consisting of a re-distillation plant to produce an augmented naphthalene fraction followed by a cooling process using an aqueous coolant, according to their B.P. 732,652. The plant is designed to process a mixed feed equivalent to 27.5 tons/day of naphthalene; and product will be of m.p. 78°C.

The plant for Avenue Works in the N.C.B.'s East Midlands Division will comprise a Still vacuum distillation column to process either a drained naphthalene oil or a blend of low naphthalene content oils, so as to up-grade the product to a naphthalene content of about 50% by weight.

International-Carl Still, a member of the International Combustion Group, are main contractors for both plants.

B.I.C.C. to Construct £2½ m. Pipeline for Canada

● A CONTRACT worth £2½ million for a 53-mile flexible submarine pipeline to carry natural gas from the Mainland of British Columbia to Vancouver Island has been given to British Insulated Callender's Cables.

The pipe, to be made in four-mile lengths, will have an internal diameter of 4.8 in. and an o.d. of 7½ in. It will be lined with successive layers of lead, steel tape and galvanised steel wire armouring.

The Hague will be Venue of 1961 S.C.I. Overseas Meeting

CHEMICALS in the Common Market and developments in the European plastics and petrochemicals industries will be the subjects of papers to be given at the 1961 annual meeting of the Overseas Section, Society of Chemical Industry. To be held at The Hague on 30 and 31 May, the meeting will be attended by S.C.I. president, Sir Alexander Fleck, K.B.E., F.R.S., who was awarded a barony in the New Year Honours. Sir Alexander will also preside at the annual dinner in the Wittebrugge Hotel on 30 May.

A reception will be given by Vereniging van de Nederlandsche Chemische Industrie on 31 May and visits will be made to the Royal Netherlands Salt Mines and Royal Dutch/Shell Group's plants at Pernis, etc.

Papers will be given as follows: 30 May; 'Recent developments in the European plastics industry' (by Dr. R. Gath, B.A.S.F.); 'The Six and its influence on the future of the European chemical industry' (by C. Hemmer, director of industry handicraft and trade, E.E.C.); 'Some aspects of the European chemical industry based on petroleum as a raw material' (by Dr. H. Hoog, co-ordinator of chemical manufacturing, Batasfse Internationale Chemie Mij.); 'Some trends in industrial pharmaceutical research' (by Professor M. Tausk, director, N.V. Organon).

Dunlop Chemical Division to Run Latex Plant

DUNLOP'S Chemical Products Division has taken over complete control, for production and sales, of the Dunlop synthetic latex plant at Erdington, Birmingham. This is to meet growing demand for synthetic latices by the paper, paint and textile industries, and for adhesives by industry generally.

The plant was previously operated by the Central Research Division, although sales were the responsibility of Chemical Products Division. The change in control is to allow greater operational flexibility.

Ethoheptazine and Poison's Rules

The Home Office has announced that pending consideration by the Poisons Board, ethoheptazine and its salts will not be added to the Poisons List (see CHEMICAL AGE, 3 December 1960, p. 953).

prompt delivery—constant high quality cc

phenol

Manufactured by
BRITISH HYDROCARBON CHEMICALS LIMITED
Supplied in stainless steel lined road tankers
and tin lined drums

Sold by
THE DISTILLERS COMPANY LIMITED—
CHEMICAL DIVISION
Bisol Sales Office
Devonshire House, Mayfair Place, Piccadilly, London, W1
Telephone: MAYfair 8867. CHEMOLY London Telex

DCL

Overseas News

JAPANESE FIRM TO PRODUCE TEREPHTHALIC ACID FROM TOLUOL

DUE to the shortage of naphthalene, raw material for phthalic anhydride and subsequent terephthalic acid production, Kawasaki Kasei Chemical of Japan, have decided to change over to toluol as a raw material for use in a 10 ton per month capacity plant at present under construction and expected to be completed by the spring of 1961. The reason for this decision is the expected decrease of 25% in the price of toluol, which gives it an advantage as a raw material over ortho-xylene and petrochemical naphthalene.

The process will use Kawasaki Kasei know-how and a patent from Henkel of West Germany. Toluol producers such as A.K.U. of Holland and certain U.S. companies are showing interest in view of the world surplus of toluol. Negotiations to exchange know-how with these companies are expected.

Ethylene, Benzene, Cumene-phenol for New Monsanto Site

A new major petrochemicals complex is planned by Monsanto Chemical Co. at Chocolate Bayou, Tex., with initial operations scheduled for 1962. Products will be ethylene (more than 500 million lb./year, plus propylene); benzene and toluene; naphthalene (50 million lb./year); phenol via cumene (with 50 million lb. phenol/year, plus acetone).

Also due for production an ethylbenzene needed for Monsanto's plans to raise styrene production from 480 million lb. to 580 million lb./year by 1962; ethylene oxide for detergents; ethane, pentanes, pentenes, indanes and indenes.

Francolor to Have S.D. Phthalic-from-o-xylene Unit

Now under construction in France is the Scientific Design Co.'s first European phthalic anhydride plant to use *o*-xylene as feedstock in Europe. It is being built for Cie. Française des Matières Colorantes (Francolor) at Villers-St.-Paul, France, by Soc. Française des Services Techniques, a member of the S.D. group.

Two New Dyestuffs Projects for India

The erection of two new dyestuff plants is announced from India. One is to be set up near Madras by the newly formed Ultramarine and Pigment Ltd. concern at a cost of Rs2.5 million to produce some 1,200 tonnes of ultramarine annually. The West German company Vereinigte Ultramarin Fabriken AG is interested in the project.

The second plant, to be erected at a cost of Rs5 million near Cambay in Gujerat State, will produce some 168 tonnes/year of dyeing liquor. Operator is another new Indian company, United Dyestuff Industries Ltd. At present Indian dye output stands at some 325 tonnes annually, as against a demand of about 1,200 tonnes.

Explosion Wrecks Oxygen Plant, Kills 13 in Ruhr

Some dozen people were killed and about 15 seriously injured as a result of an explosion in an oxygen plant of Knapsack-Griesheim at Dortmund in the Ruhr, the plant being completely destroyed. The plant was on the premises of the Westfalen Hütte steel works; it supplied liquid oxygen to the steel works and to other plants in the area. The explosion is believed to have occurred while oxygen was being drawn off into containers, but the actual cause has not yet been established.

Of the 30-35 men working in the plant at the time, only three escaped unharmed. Buildings surrounding the plant were also damaged by the blast.

Mitsubishi Negotiate Cumene-phenol Technique with Mitsui

Mitsubishi Petrochemical have been in negotiation with Mitsui Petrochemical with regard to the technique for synthetic phenol production from cumene. Mitsui, however, think that it will be more to their advantage to sell the manufactured phenol rather than the technique since they have invested considerable capital in establishing the process development, such as know-how cost to Distillers and expenditure on their own process development. Also an increase in the demand for phenol and acetone is forecast.

Three Men Killed as U.S. Atomic Reactor Blows Up

Three men operating a low-power experimental nuclear reactor at the U.S. Atomic Energy Commission's testing station near Idaho Falls, Idaho, were killed when the pressure vessel containing the reactor exploded into the basement room where it was housed. The reactor was a prototype of a packaged unit that is under development as source of power for remote areas of the world. It used highly enriched uranium, packed in aluminium and niobium cans, as fuel, the coolant being water.

The explosion took place at night, when there was only a small staff working at the station. Emergency measures to isolate the area in which the explosion took place, and to limit the spread of radiation, were brought into immediate effect by the A.E.C., so that normal working was possible in the non-affected areas of the Idaho Falls station the next morning.

Cause of the explosion has not yet been discovered, except that the uranium fuel appears to have become overheated to an extent where the coolant water become ineffective, leading to an excessive build-up of pressure inside the reactor shell. One A.E.C. spokesman pointed out the possibility than an explosion may have been caused by a reaction between aluminium components and the boiling water.

Japanese Firm to Use Sohio Process for Acrolein

The Japanese firm, Sumitomo Chemical, are to use the Standard Oil of Ohio process for the manufacture of acrolein. This is a direct oxidation reaction based on propylene and ammonia. Until now Sumitomo have been using the condensation reaction of acetaldehyde and formaldehyde. The new process will result in a saving of costs, and will be used at the Tsurusaki plant in the Ohita Prefecture which has a capacity of 1 ton per day. The raw material will be supplied from Niihama.

S. Africa's £¾ m. Carbon Black Plant Starts Production

A new £750,000 carbon black plant, the first of its kind in Africa, recently started production in Port Elizabeth, South Africa. Operated by Phillips Carbon Black Co. Ltd.—owned 50-50 by the Industrial Development Corporation of South Africa and the Phillips Petroleum Co., New York—the plant will produce 22 million lb./year of carbon black for the tyre industry and rubber manufacturers in southern Africa.

About a third of the plant's feedstocks will be drawn from the Standard-Vacuum Oil refinery in Durban; the remainder will come from the U.S.

Joint German-American Polyester Fibre Venture

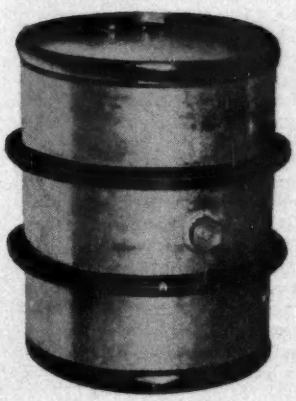
A joint enterprise, Faserwerke Hüls GmbH has been established by Chemische Werke Hüls AG, Marl, Westphalia, West Germany, and Tennessee Eastman Co., Kingsport, Tennessee, U.S., to produce and sell Eastman's polyester fibre in the growing European textile market. The fibre will eventually be produced in a new factory that Faserwerke now have under construction at Marl in the north of the Ruhr area. Meanwhile Faserwerke will import fibre manufactured by Tennessee Eastman.

Three Dutch Urea Plants for U.S.S.R.

The Werkspoor Engineering Co., Amsterdam, have recently received an order from the Soviet Union for the supply of equipment for three complete urea plants each of which will have a capacity greater than that of any modern urea plant in operation or under construction elsewhere. The plants will be built to designs used for the process developed by a subsidiary of the Netherlands State Mines.

There are Braby Drums for every purpose — oils, insecticides, liquid chemicals, greases and powders.

Braby Drums are obtainable in many sizes, types and weights and in a variety of finishes, both exterior and interior. Painted, galvanized, shot-blasted and lacquered finishes can be supplied and the exteriors of certain drums can be decorated to customers' designs.



Write for details to

FREDERICK Braby & CO LTD

LIVERPOOL Havelock Works, Aintree, Liverpool 10
Tel: Aintree 1721

HEAD OFFICE: Braby House, Smithfield Street, London, E.C.1
Tel: Central 2388

CRAYFORD · GLASGOW · BRISTOL
BELFAST · PLYMOUTH

MEMBER OF BRABY OF BRITAIN GROUP

AP191

Chemicals in the Common Market

West German Chemical Output Rises 70% in Five-year Period

CHEMICAL production in West Germany has risen by 70% in the period from 1955 to the end of 1960. There are at present some 460,000 chemical workers in the country, of whom 60% work in plants with over 1,000 employees and of which grand total 35% work for the five successor companies to the liquidated I.G. Farben group (Bayer, Hoechst, B.A.S.F., Chemische Werke Hüls and Casella). These five companies alone now account for 39% of the complete turnover of the national chemical industry, as well as 50% of all chemical investments and 55% of all exports.

Main Chemical Producer

As well as leading the Common Market bloc in overall industrial production, Federal Germany is the main chemical producer of the group. Chemical output is increasing steadily and rapidly, particularly in the two lines in which Germany specialises—plastics and synthetic fibres. The country's three main producers alone (Farbenfabriken Bayer, Farbwerke Hoechst and B.A.S.F.) are to spend something like £80 million on investments in the current year. In all fields of chemical production, with the possible exception of fertilisers, German capacities are rocketing, and it seems certain that the country's important place in world markets will remain impregnable. So many projects are announced for the future that a simple list forms the best means of communicating the major among them.

A joint subsidiary is to be formed by the German oil company Deutsche Erdöl AG and the chemical producers, Reichhold Chemie AG, both of Hamburg, for the production of petrochemicals at Brunsbüttelkoog, near the Deutsche Erdöl Hemmingstedt refinery on the North Sea. Production is hoped to start in 1961.

B.A.S.F. between 1962 and 1963 will boost caprolactam output from 30-35,000 tons-year to 50,000 tons.

One of Europe's biggest petrochemical producers, Chemische Werke Hüls AG, of Marl, are to expand capacities for p.v.c., polystyrene and polyolefins, having recently doubled ethylene oxide capacity and expanded ethylene, styrene, polythene and phthalic anhydride production. The company continues to experiment with 1.4-*cis*-polybutadiene.

The synthetic rubber producers, Bunawerke Hüls GmbH, also of Marl, in whom Chemische Werke Hüls hold 50% of the capital, are to increase annual production of 120,000 tonnes, possibly by early 1961. Annual output level is at present only about half this capacity.

1960 saw the opening of a new high-temperature pyrolysis unit and expansion of polymerisation capacity at the main Frankfurt-on-Main plant of Farbwerke Hoechst AG. Hoechst are heading a study consortium of German and overseas companies who aim to set up a refinery and olefin and synthesis gas plants in the Frankfurt area, which would enable Hoechst to expand their petrochemical interests. Hoechst are to link with Tennessee-Eastman for the production of polyester fibres (see p. 102).

Farbenfabriken Bayer AG, of Leverkusen, plan expansion of plants for the production of Dralon and Perlon.

The Farbenfabriken Bayer-Deutsche B.P. joint subsidiary Erdölchemie GmbH, Dormagen-on-Rhine, started this year with the production of ethyl alcohol. Other plants commissioned in 1960 were for ethylene and ethylene glycol.

Carbon Disulphide

In 1962 a carbon disulphide plant with an annual capacity of 57,000 tonnes is to be opened on the site of Glanzstoff-Courtaulds GmbH in Cologne by Carbosulf Chemische Werke GmbH, Cologne, a joint subsidiary of the former concern and Dr. Jacob Chemische Fabrik GmbH. Local petrochemicals will be used as raw material, and the plant will work under a licence of the Food, Machinery and Chemicals Corporation, New York.

Dynamit Nobel AG, Troisdorf, and the Feldmühle group have signed an agreement for the erection of a vinyl chloride plant on the site of the Feldmühle works.

The Cologne oil refinery of Esso AG in Cologne will in 1961 open new petrochemical units at a cost of nearly £4.5 million. The refinery, which is near to that just opened at Godorf by Deutsche Shell AG, will thereby raise the share of olefins in total production from 6% to 12%.

B.P. Benzin und Petroleum AG, are to devote about 6% of their new Dinslaken refinery output to the production of benzene.

A large plant for the production of dimethylterephthalate is being built in the Ruhr by Chemische Werke Witten GmbH.

During the latter part of 1960, Bunawerke Hüls added carbon-black rubber to their range. Chemische Werke Hüls are introducing polybutadiene rubber (Hüls say a 20,000 tonnes/year plant could be on stream by 1963) made by a Hüls-developed process and polydiolefins, made under a licence from Studiengesellschaft Kohle mbH, Mulheim. Hüls are also to raise their p.v.c. output from 50,000 to 80,000 tonnes/year in 1961. By the end of this year, styrene monomer output will be raised to 30,000 t.p.a.; Hüls are in the process of commissioning a 3,600 t.p.a. polypropylene plant

Other Chemicals. A plant for the production of titanium oxide pigments is to be erected and brought into operation at Homberg by Pigment-Chemie GmbH, recently formed subsidiary of Sachtleben AG für Bergbau und Chemische Industrie and the E. I. Du Pont de Nemours. Output, to start in 1962, will be of some 18,000 annual tonnes; Farbenfabriken Bayer plan to expand their existing titanium oxide capacity.

Bayer also plan the building of a large plant for chlorine electrolysis in Uerdingen. B.A.S.F. also have plans for a large new plant for the electrolytic production of chlorine and caustic soda. To be on stream in the autumn this year, the plant will use newly developed mercury cells of B.A.S.F. construction; these will normally be charged with a current strength of 150,000 amp. Also in the heavy chemicals field, B.A.S.F. are currently running a 150 tonnes/day calcium plant developing a new 'oxy-thermal process'. This is said to have a decided economic edge over the electro-thermal process and existing plants are likely to be replaced by the new process.

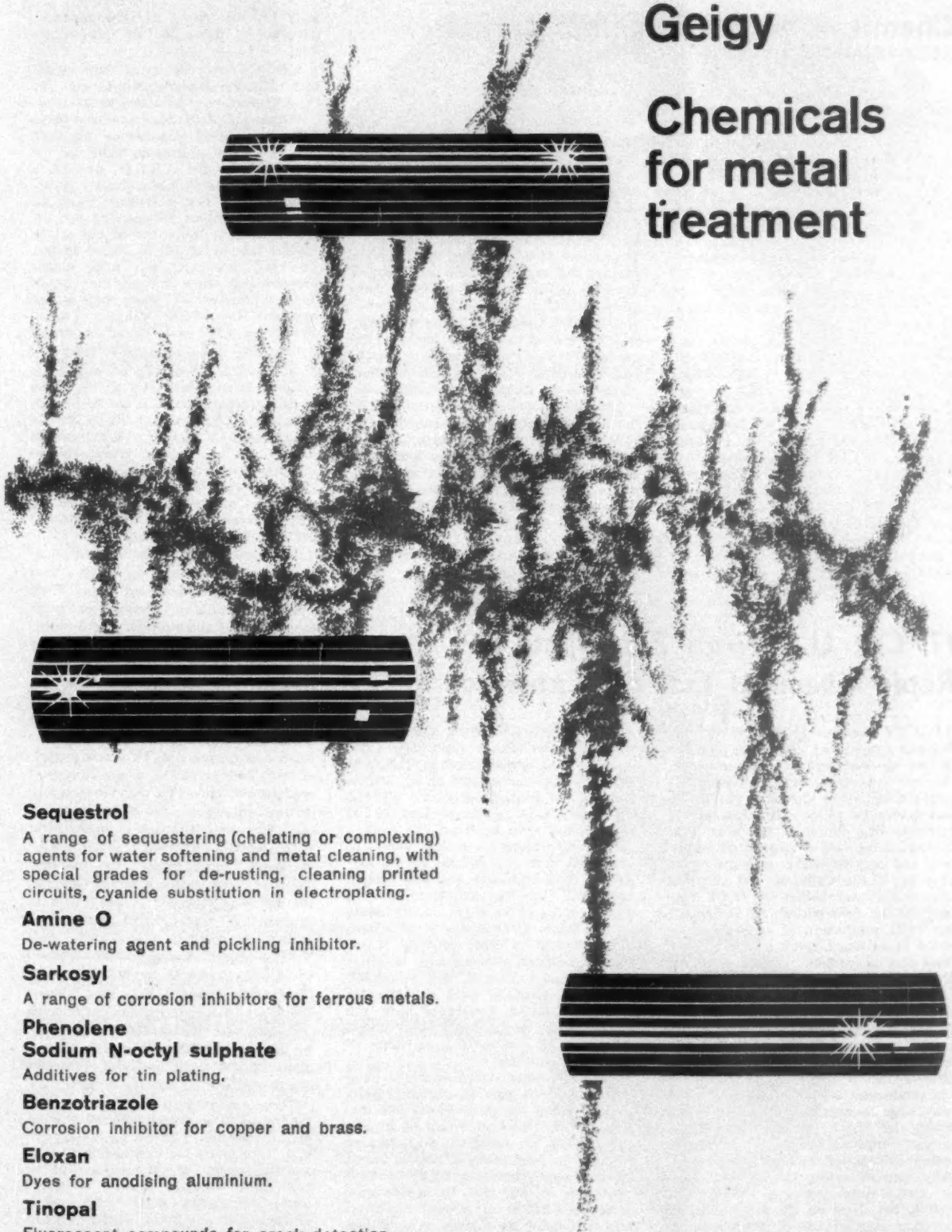
West Germany now has a second urea producer, Union Rheinische Braunkohlen Kraftstoff AG having come on stream at their plant near Cologne with 25,000 t.p.a. of urea. produced under licence from Stamicarbon of the Netherlands.

In the catalysis field, two U.S.-German production links were forged in 1960.

Concluded from Chemical Age, 7 January, Page 11.

Geigy

Chemicals for metal treatment



Sequestrol

A range of sequestering (chelating or complexing) agents for water softening and metal cleaning, with special grades for de-rusting, cleaning printed circuits, cyanide substitution in electroplating.

Amine O

De-watering agent and pickling inhibitor.

Sarkosyl

A range of corrosion inhibitors for ferrous metals.

Phenolene
Sodium N-octyl sulphate

Additives for tin plating.

Benzotriazole

Corrosion inhibitor for copper and brass.

Eloxan

Dyes for anodising aluminium.

Tinopal

Fluorescent compounds for crack detection.

Belloid

A range of surface active agents for wetting, dispersing, degreasing — for example in pickling, cleaning and anodising baths.

Samples and information from

Development Division
The Geigy Company Ltd
Rhodes Middleton Manchester

E 39

Chemicals in the Common Market

Girdler-Südchemie Katalysator GmbH, Munich, plan a new production unit at Moosburg, South Germany. The plant will produce catalysts for the petrochemical and nitrogen industries, for the production of town's gas, fatty acids, etc. The company is equally owned by Chematron Corporation, Chicago, and Süd-Chemie AG, Munich. Houdry of the U.S. and Chemische Werke Hüls have similarly set up a joint company—Katalystorenwerke Houdry-Hüls—to develop, make and sell the two firms' catalysts. The new company will be based at Marl.

A new pharmaceutical works was opened in the autumn of 1960 in Neustadt am Rübenberge by Kali-Chemie AG, Hamburg, following which they are to close their plants at Munich and Hamburg. Rohm und Haas GmbH, Darmstadt, and Smith, Kline and French, Philadelphia, have formed Rohm und Haas-AG mbH, to take over pharmaceutical production of the German parent and to introduce S.K.F. products to West Germany and Austria. Head office is in Darmstadt.

Several overseas firms have entered the industry in Germany and will start production over the next few years. These include Kali-Chemie-Stauffer GmbH (50-50 Kali-Chemie and Stauffer Chemical, U.S.) for the production of sulphur for the rubber industry; Wöhm-Labaz GmbH (a joint subsidiary of the Belgo-French pharmaceutical firm Laboratoires Labaz and M. Wölm, West Germany) and Dow Chemie GmbH, formed in Dusseldorf by Dow Chemical International for the production of and trading in chemicals, plastics and metals. Proctor and Gamble GmbH is a new Frankfurt company formed as a subsidiary of Proctor and Gamble, Cincinatti, for local production of fine chemicals, synthetic detergents and possibly chemicals for cosmetics and foodstuffs. The plant will probably be sited in the Ruhr and Mannheim area.

Changes in company structures include the formation of a special chemical company under the name of Deutsche Shell-Chemie GmbH by Deutsche Shell AG, Hamburg; complete absorption into Farbwerke Hoechst of Knapsack-Griesheim AG and Kalle AG and the reformation of Dynamit AG vorm. Alfred Nobel und Co. under the name of Dynamit Nobel AG, after the company's takeover by the Flick industrial group.

ITALY: U.S. Firms Participate in Rapid Chemical Industry Expansion

ITALY'S chemical industry is expanding at a rapid rate, one which promises to become even more accelerated over the next few years. Over the first three-quarters of 1960, chemical production was higher by 17.5% than that for the corresponding period of last year. Production in the field of mineral oil derivatives and coal derivatives over the period rose by 17.4% Cellulose and chemical fibre output was higher by 22.7% than that for the 1959 period. As at September 1960, production of synthetic fibres stood at an index figure of 1,419 (1953: 100), that of synthetic resins at 766.9 and that of liquid gas at 581.1.

Particular stress is being placed on he country's future petrochemical production as far as type of output is concerned and on Sicily and in the industrial northern district as far as regional development is concerned. Most chemical production is in the hands of a few very large companies, outstanding among these the E.N.I. and A.N.I.C. State-owned companies and the private Montecatini, Edison and Bombrini groups, and it is these big producers with whom most of Italy's development in the chemical sphere lies. New on the scene and with an increasing amount of importance are Italian subsidiaries of U.S. chemical producers.

In the general petrochemicals field the main projects of the future are the Gela complex being built on Sicily by E.N.I., and Montecatini's plans for Brindisi, where by 1962 1.5 million tonnes of oil will be converted to chemicals. Construction has been started by E.N.I. at the Gela site, the biggest of its kind in Europe, and initial production is planned for 1962. Costing about Lire 100,000 million, the Gela complex will have a throughput of about 3 million tonnes of crude oil delivered by the E.N.I. subsidiary Agip-Mineraria and will contain equipment for the annual output of 60,000 tonnes of liquid gas, 15,000 tonnes of polythene, 4,000 tonnes of propylene, 17,000 tonnes of other ethylene derivatives and quantities of solvents, fertilisers and petroleum coke, as well as 110,000 tonnes of sulphuric acid enabling the output of 60,000 tonnes of urea and 65,000 tonnes of ammonia. Total annual production is estimated at a value of Lire 45,000 million.

The same State concern is also to build a petrochemical plant of smaller capacity at Ferrandina for some Lire 40,000 million. In Rho, near Milan, Shell Italiana are erecting an extraction and cracking unit for the production of 100,000 tonnes of aromatic solvents annually to start operation in mid-1961 in co-operation with the Condor oil refinery on whose site it is going up. Celene, a joint subsidiary of Societá Edison and Union Carbide, are to open a plant for the production of polythene, ethylene oxide and derivatives at Prioli, Sicily. Dow Italiana, a subsidiary of Dow Chemical International, plan to erect a plant in Italy for the output of Dow products, particularly those in the polystyrene field.

A.N.I.C. have completed their 20,000 t.p.a. Houdry dehydrogenation unit for the manufacture of butadiene at Ravenna.

Within the plastics and synthetic fibres fields, the newest introduction has been that of a plant at Ragusa, Sicily, for the production by the A.B.C.D. concern, a member of the Bombrini-Parodi group, of Riblene, a new polythene. Produced by a high-pressure oil cracking process, the material is to be turned out at the annual rate of 12,000 to 13,000 tonnes. In 1961, Bombrini will raise maleic anhydride capacity beyond the current 3,000 tonnes/year. To raise their maleic capacity to 10,000 tonnes, Ftalital brought a 3,500-tonne plant on stream in late 1960 and plan a 5,000-tonne unit in 1961.

Filon plastics materials of the Filon Plastics Corporation, U.S., are to be produced at a plant being built by Societá Plastici Vetro Rinforzati at San Damiano in the Milan region, while foreign interests are concerned in the opening at Trino Vercellese (near Vercelli) this year of a thermoplastics plant by the Anglo-Franco-Belgo-U.S. concern Societá per Azioni Plastica Italiana.

The Montecatini group plan the opening of production units for 9,000 tonnes of polypropylene fibres and film at Terni and for quantities of polythene and polypropylene and allied products at Brindisi; total polypropylene resin output will rise to 20,000 tonnes. The important Italian synthetic fibre manufacturer, Snia Viscosa, of Turin, have announced a project to produce synthetic fibres from natural gas and are opening a plant for the production of caprolactam by a new process of their own invention; this factory will produce one half of the company's caprolactam consumption for nylon manufacture. This same company is interested in a Lire 9,000 million plant to be opened at Zaule, near Trieste, by Industria Triestina Applicazione Chimica Organica for the production of 20,000 tonnes of caprolactam and 90,000 tonnes of ammonium sulphate annually (the Snia Viscose process has since been licensed to Allied Chemical in the U.S., and Courtaulds in the U.K.). Snia Viscosa subsidiary, Siace of Palermo, will come on stream at Piazza Armerina, Sicily, by the end of 1962, with a plant to produce 30,000 tonnes/year of cellulose. Eucalyptus will be the raw material.

Three new projects are reported from the Italian carbon black industry. Columbian Continental Europe S.p.A.—a company formed by the Continental Carbon and Columbian Carbon companies of the U.S.—have recently opened a 27,000 tonnes/year plant near Milan, while Phillips Carbon Black Italiana S.p.A. (Phillips Carbon Black plus A.N.I.C.) are to open a 12,000 tonnes/year unit in 1961 and Cabot Italiana, another U.S. affiliate plan a plant at Ravenna with an annual capacity of 15,000 tonnes.

Among other projects are several con-

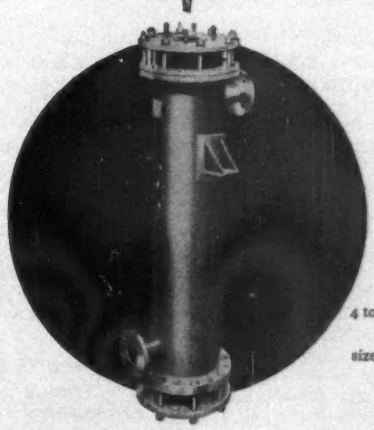
THE PROBLEM OF CORROSIVE VAPOURS

POWELL DUFFRYN
DELANIUM
CARBON & GRAPHITE
CARBON PRODUCTS LIMITED

The condensation of corrosive vapours poses special problems for designers of equipment used in the Chemical and Allied Industries.

THE PD GRAPHITE CARTRIDGE CONDENSER

provides a solution that functions perfectly in the presence of most acid and solvent vapours up to a maximum graphite temperature of 180°C.
Protection for the steel cartridge is provided internally against corrosive service fluids and externally against corrosive atmospheres.



10 models from 4 to 500 sq. ft. H.T.A.
20 sq. ft. cartridge size 8" dia. x 4 ft. long

POWELL DUFFRYN
A MEMBER OF THE POWELL DUFFRYN GROUP

Leaflet C11/59 gives full technical details.

POWELL DUFFRYN CARBON PRODUCTS LIMITED

CHEMICAL ENGINEERING DESIGN, FABRICATION, INSTALLATION AND COMMISSIONING

SPRINGFIELD ROAD, HAYES, MIDDLESEX. TELEPHONE: HAYES 3994

U.P.7738

tained within the development programme of Montecatini, who over the coming four years will spend about Lire 200,000 million in doubling chemical output. Apart from the projects already mentioned, this programme foresees the building of a paint and varnish works at Codogno, near Milan, and a unit for the production of dimethylterephthalate by the Katschmann process, licensed from Chemische Werke Witten. Capacity for fluorine derivatives at Spinetta Marengo is to be tripled; also at this site is a plan to raise titanium oxide capacity from 18,000 to 40,000 tonnes/year. A major expansion in urea is planned at Vetrocoke.

A.C.N.A.-Montecatini have opened a 10,000 tonnes/year phthalic anhydride plant at Cengio, which uses a U.S. process.

The Sicilian potash industry is to increase its annual output, only 60,000 tonnes in 1958, to a future level of 3,300,000 tonnes. Potassium deposits at Pasquasia are to be developed by the Trinacria company; the Campofranco potash fertiliser plant of the Montecatini group is to be substantially expanded and the San Cataldo potassium mines which feed Campofranco are to be further exploited. Montecatini's fertiliser output at Porto Empedocle is to be doubled. The island's sulphur industry is to be reorganised with the aid of the Common Market organisation.

Another big new Sicilian project is the piping of Saharan natural gas from Cape Bon to Mazara del Vallo, near Trapani; capacity will be around 1,500 million cu. m. a year. A new company has been set up by Italian firms to handle the project; taking part in S.O.S.I.M. (Sicilian Methane Pipeline Co.) are SINCAT, associates of Monsanto Chemicals and Societa Edison, Montecatini and Fiat.

In Sardinia, Societa' Algherese Industrie Chimiche Agricole (S.A.I.C.A.) of Alghero plan to build an oil refinery at Porto Torres with a capacity of 1,200,000 tonnes a year. The refinery will have a Udex plant scheduled to produce aromatic hydrocarbons (160 tonnes/day) and an olefin plant (about 100,000 tonnes/year).

Another Sardinian company, Sarda Industrie Resine (S.I.R.) has applied for permission to build, also at Porto Torres, a refinery with the capacity of 1,200,000 tonnes/year which will produce chemicals as well as petroleum products. The programme includes plants for the production of olefins (about 240,000 tonnes/year) and derivatives, aromatic hydrocarbons, alkylates, polymers, etc.

With U.S. Rubber aid and know-how, Rumianca are to build a 10,000 tonnes/year p.v.c. plant at Pieve Vergonte; on stream time is scheduled for mid-1962. Rumianca S.p.A. are to come on stream in the first half of 1961 with a citric acid plant at their Avenza plant, north Italy; production will cover total Italian demand and allow for exports.

In the pharmaceutical field, Upjohn International Operations Inc. have formed a 100% subsidiary in Milan for production and sale in Europe, while Cyanamid Italiana are to build a pharmaceuticals plant at Catania, Sicily, to supply the Common Market.

Air Products Inc., U.S., are building a $3 million oxygen plant near the Cornigliano steel works, Genoa, to produce 426 tonnes/day of oxygen. Construction is being handled by Air Products Ltd., U.K.

G.E. New One-carat Man-made Diamonds Point Way to Further Industrial Uses

FOR the first time, synthetic diamonds of over one carat in size have been made in the Research Laboratory of General Electric (U.S.) at Schenectady. This latest development is of great interest to industry, although the new diamonds are not yet suitable for industrial use. General Electric diamonds have so far been used for grit, and have been particularly suitable in this application when resin bound on an abrasive wheel.

The sales of industrial diamonds from African sources totalled £28 million in 1959. G.E.'s target for synthetic diamonds is understood to be 3 million carats per year—a small part of the world's sales, although with the larger size now being made there is more possibility of U.S. becoming independent of outside sources of industrial diamonds. This development is also of importance in the light of the disturbances in the Congo—the largest source of industrial diamonds—which have already led De Beers to set up a synthetic diamond plant near Johannesburg.

No details of the process for the larger synthetic diamonds have been given. The largest stones so far are dark in colour and have flaws. To produce diamonds of an acceptable colour, much fundamental research into the nature of colour in diamonds will have to be made. Colour in natural diamonds is sometimes the result of a rearrangement of the atoms in the crystal lattice, an effect which can be achieved by irradiation of diamonds with neutrons or electrons. The electron effect however does not go right through the crystal and the colour produced is not comparable with the natural gem.

General Electric make no claim as to the possibility of producing gem-quality stones; their interest is solely in industrial diamonds. A size of 1/10 carat is now made of a suitable industrial quality but is not yet available commercially.

Q and Q Extend Training Course

Quickfit and Quartz Ltd., makers of interchangeable laboratory glassware, have announced an extension of the training scheme for glassblowers at their Stone (Staffs) factory. A further course for 20 young men had now been started. This 12-months' course would bring them up to fully skilled standards.

B.S. for Quaternary Ammonium Compounds

A LABORATORY method for the evaluation of the disinfectant activity of quaternary ammonium compounds, which is based on a procedure developed by the British Disinfectant Manufacturers' Association, has been adopted as a British Standard in order that a similar method may be used in every laboratory.

Essentially, the method consists of adding a suspension of viable micro-organisms to solutions containing concentrations of the quaternary ammonium compound, and determining the number of organisms surviving after a period of time. Within this framework the test conditions may be varied for the particular purpose. It can be used, for example, as a screening test to compare the activities of quaternary ammonium compounds under specified conditions, either in the presence or absence of organic matter; to compare the activities of quaternary ammonium formulations at the recommended dilutions of use; or as a screening test against a range of organisms. Detailed examples of such tests are given in an appendix.

Copies of the standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1, price 6s.

Need for Special Fire Warning System

SPECIAL problems of chemical works in carrying out fire drills demanded by the Factories Act 1959 were mentioned at a meeting of industrialists, architects and building surveyors, arranged by Manchester Fire Brigade.

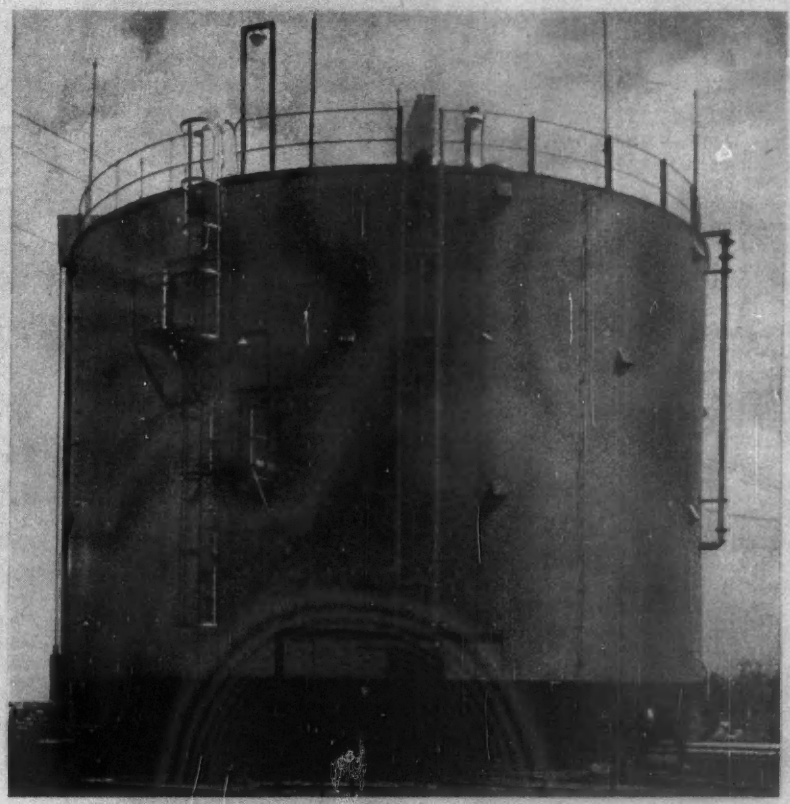
One speaker said that in some situations, like chemical works, it could be more dangerous, in the event of a small fire, to evacuate the works than to keep operatives at their posts. It seemed to him that a special fire warning system was needed—a general alarm indicating there was a fire and a second warning signal indicating that the fire was serious and the plant should be evacuated. In plants where there were continuous processes fire drills were most difficult to organise.

Guide to Plastics

A new illustrated reference book is aimed at providing concise and comparative data on machinery and materials required by the specialist interests within the plastics industry, and at interpreting the properties and methods of fabricating plastics for consumer industries employing plastics. It commences with an international review of the plastics industry, then deals in turn with plastics fabricating processes, main and ancillary processing machinery, mould makers, engineering data, properties of plastics, specifications main and ancillary plastics materials, moulders and fabricators, concluding with a reference section and indexes.

Compiled and produced in association with the journal *Plastics*, the book, pp. 488, is published by Temple Press, London, at 63s net.

A 40,000 cu. ft. capacity Wiggins dry seal gasholder.



500 WIGGINS DRY SEAL GASHOLDERS ARE IN OPERATION THROUGHOUT THE WORLD

Wiggins dry seal gasholders, for the storage of a wide range of gases, have been successfully operating for over 20 years. Capacities range from 50 cu. ft. to 5,000,000 cu. ft.

ADVANTAGES

LOW OPERATING AND MAINTENANCE COSTS
CLOSE CONTROL OF GAS PRESSURE
EQUAL GAS PURITY AT INLET AND OUTLET
QUICK PURGING
SIMPLE FOUNDATIONS

PGC

THE POWER-GAS CORPORATION LIMITED
STOCKTON-ON-TEES AND LONDON
DAVY-ASHMORE GROUP

469

PARIS · MONTREAL · MELBOURNE · JOHANNESBURG · BOMBAY

PEOPLE in the news

● **Mr. C. McCormick** joined the Chemical Department of C. Tennant, Sons and Co. Ltd., 4 Copthall Avenue, London E.C.2, at the beginning of January. He was previously with Exsud, South American Minerals and Products Co. Ltd.

● **Mr. C. H. Brock,** director in charge of finance and administration with Courtaulds (Canada), has been appointed a senior executive in the overseas investment department of Courtaulds Ltd. in the U.K. He will leave for England next April to take up his appointment at the parent company's head office in London. **Mr. N. I. Battista,** a director and an assistant general manager of Courtaulds (Canada) will assume responsibility for financial policy and co-ordination. **Mr. F. M. Bradley** has been appointed Courtaulds (Canada) comptroller and general deputy to the treasurer.

● **Sir Eric Rideal, Kt., F.R.S.,** former professor of physical chemistry at King's College, London, and a former director of Monsanto Chemicals Ltd., will receive an hon. D.Sc. at Queen's University, Belfast, in July.

● **Mr. N. R. Dent, A.M.I.Mech.E.,** has been appointed manager of the Fisher Governor Co. Ltd., a member of the Elliott-Automation Group.

G. E. Beharrell, chairman of Dunlop Rubber Co. Ltd. (left), created a Knight Bachelor in the New Year Honours, and J. Black (right), works manager of I.C.I. Mossend Works, who receives the O.B.E.

● **Mr. Brian N. Reavell, B.Sc., A.C.G.I., M.Inst.Chem.E., M.Inst.Mech.E., M. Inst.F.,** has now assumed the chairmanship of the Kestner Evaporator and Engineering Company Ltd. and the Kestner Group of companies, following the retirement from the chair of his father, **Mr. J. Arthur Reavell,** as reported in CHEMICAL AGE last week (p. 19). Mr.

J. Arthur Reavell

Brian Reavell was previously deputy chairman and joint managing director.

● **Mr. J. A. Palmer,** who has retired aged 75, founded with the late Mr. John Mann the salt firm of Palmer Mann and Co. Ltd.

● **Mr. George Large** is to be resident manager of Q.V.F. Glass (Canada) Ltd., Canadian subsidiary of Q.V.F. Ltd. Formerly Q.V.F.'s Scottish representative, he has been with the company since its inception in 1952. Mr. Large's successor as Q.V.F. Scottish representative is **Mr. R. Jenkins.**

Using a pressure cooker, Dr. H. A. Thomas, technical director, marketing division, Courtaulds Ltd., demonstrates on a small scale how Tricel fabric is permanently pleated, during a recent London lecture to young people on the subject of plastics and textiles. The lecture was arranged in collaboration with the Plastics Institute

● **Dr. P. H. Sykes, M.Sc., Ph.D., F.R.I.C., M.I.Chem.E.,** director of research and development of the Reed Paper Group, has been appointed deputy managing director of Albert E. Reed and Co. Ltd., Blackfriars House, New Bridge Street, London E.C.4. Before joining Reed in 1958 he was technical and research director of the British Oxygen Group. Since 1958 Dr. Sykes has organised and expanded the Research and Development Division, which includes the international development departments that handled the investigations and negotiations which, during 1960, resulted in the Group entering the European Free Trade Area, Common Market and the Commonwealth.

● **Mr. W. H. Reay, B.Sc., A.M.I. Chem.E.,** has been appointed general manager of Luwa (UK) Ltd., a recently formed British subsidiary of Luwa AG,

W. H. Reay

the Zurich, Switzerland, chemical engineering concern. Mr. Reay joined the Luwa organisation in July 1960.

● Following the recent appointment of **Mr. S. Douglas** as director, the British Man-made Fibres Federation now announces the appointment of two assistant directors—**Mr. B. Clark** (Manchester) and **Mr. C. Bellingham-Smith** (London). Mr. Clark, who joined the Federation in 1946, has been head of the statistical department since 1949. Mr. Bellingham-Smith has spent all his working life with the British Employers' Confederation, and was principal assistant (international) from 1952 to 1960.

● **Herr Wilhelm Meyerheim** and **Herr Walt Wilhelm** have been appointed directors of Farbenfabriken Bayer AG, Leverkusen, West Germany, from 1 January.

● **Dr. D. E. Hoare,** lecturer in physical chemistry at Queen's College, St. Andrews, has received an award under the Royal Society and Nuffield Foundation Commonwealth Bursaries Scheme to enable him to study reactions of hydroxyl radicals with hydrocarbons at the National Research Council, Ottawa, from April to September 1961. **Dr. M. M. Chakrabarty,** reader in applied chemistry at Calcutta, has received an award to study new techniques in the investigation of fatty oils at the Prairie Regional Laboratory, Saskatoon, and possibly later at the Paint Research Station, Teddington, for six months from March.

● **Dr. E. M. Vyner, F.R.I.C., M.I. Chem.E.,** has been appointed director of research for the recently formed company of Leiner-De Mulder Ltd., Doncaster. A graduate of Prague University, during 20 years with Sheppey Glue and Chemical Works Ltd. he became director and works manager. The Vyner degreasing process, perhaps the most noteworthy development from his research work, is employed at the Queenborough factory and has been patented in many countries. The new Queen-

(*Continued in page 114*)

CARLESS

SPECIAL NAPHTHAS

- Specific gravity 0.860—0.865
- Distillation range 145°C—180°C
- Flash point minimum 87°F
- Specifications varied to meet requirements of individual customers

Let us send you a sample and a quotation

Hydrocarbon Solvents and Diluents

CARLESS, CAPEL & LEONARD, LTD.
HACKNEY WICK, LONDON, E.9 *Amherst 5500*

---

new from the **BUSH** laboratories

Guaiacol Phenylacetate
*
Heliotropine Sodium Bisulphite
*
Piperonyl Alcohol
*
Piperonylic Acid

BUSH

fine chemical manufacturers

W. J. BUSH & CO LTD · LONDON E8 · ENGLAND · CLISSOLD 1234

Commercial News

- **Current Year Results are Good, say B.G.C.**
- **W. J. Bush Pay More on Interim Dividend**
- **Dussek Bros. Acquire Claud Campbell**
- **Polymer Corp. Form German Subsidiary**

British Glues

Interim dividend of 5% (same) is announced by British Glues and Chemicals Ltd. Results for the current year to date are somewhat better than those for the corresponding period last year. If, as directors anticipate, current trading conditions continue, they expect to recommend a final for year ending 31 March 1961 of 17½% (same).

W. J. Bush

W. J. Bush are effectively raising their 1960 interim payment from the equivalent of 2½% to 3½% on capital as increased by a one-for-two scrip issue. The previous year's total was equivalent to 9½%.

William Briggs

Group net profit of William Briggs and Sons, tar distillers, etc., for the year ended 30 September was £154,205 (£117,708). Dividend is 14% (same).

Dussek Brothers

A controlling interest in Claud Campbell and Co. Ltd. has been acquired by Dussek Brothers and Co. Ltd., who have merged the business of their subsidiary, Waxes Ltd., with that of Claud Campbell. The name of Claud Campbell and Co. has been changed to Claud Campbell Waxes Ltd.; the directors of Waxes Ltd., and Mr. A. W. Thompson, of Dussek, have joined the board of the new company with the directors of Claud Campbell and Co.

Rochdale Wall Paper

Following negotiations previously reported in CHEMICAL AGE, I.C.I. have now acquired the entire issued share capital of Rochdale Wall Paper Printing Co. Ltd. of Roach Vale Mill, Rochdale, Lancs. This company will go into voluntary liquidation on 31 January and the company's Roach Vale Mill will become a part of the undertaking of Withins Paper Staining Co. Ltd. of Radcliffe (another I.C.I. subsidiary) and will continue in full production in the future.

Woolley Sons and Co.

Net profit for the year ended 31 March 1960, was £8,509 (£17,039); no dividend (2½%) will be paid.

Farbwerke Hoechst AG

Farbwerke Hoechst AG, Frankfurt, have become the first German company since World War I to have its shares represented on the Brussels Bourse. Some DM630 million worth of Hoechst shares have been released for handling by the Bourse.

Quimica General S.A.

Quimica General S.A. is the name of a new company to be set up in Mexico by an international consortium with an initial capital of $5 million. Interested in the new concern are the Celanese Corporation of America, Chemcell Ltd., Canada, and Farbwerke Hoechst AG, West Germany. The new company will take over all production except that of synthetic fibres from the existing Mexican concern Celanese Mexicana S.A.

Polypenco GmbH

Polypenco GmbH is the name of a new company formed in Cologne as a subsidiary of the Polymer Corporation for the sale in Federal Germany of polymeric plastics.

Reichhold Chemie AG

The Swiss member company of the international Reichhold chemical group, Reichhold Chemie AG vorm. Oel- und Chemie-Werk AG, Hausen, who, during the last financial year raised their capital from S. Fr.5 million to S. Fr.10 million, again announce no dividend for the past financial period.

S.p.A. Carlo Erba

S.p.A. Carlo Erba, pharmaceutical producers, Italy, have increased capital from Lire 3,000 million to Lire 3,500 million. The firm's turnover is up by 12% on the previous year and exports higher by 40%.

NEW COMPANIES

C. F. GERHARDT LTD. Cap. £100. Importers and exporters of and dealers in drugs, chemicals, etc. Directors: R. G. Archer and W. J. D. Gardner. Solicitors: Freshfields, 31/45 Gresham Street, London E.C.2.

SOLVENT RECOVERIES (WIMBORNE) LTD. Capital £100. Consultants and commercial and technical advisers in connection with the manufacture of pharmaceutical preparations, solvents, chemicals, etc. Directors: G. H. Osborn and T. M. Osborn. Reg. office: Sussex Chambers, 8/10 Havelock Road, Hastings.

INCREASE OF CAPITAL

MURPHY CHEMICAL COMPANY LTD., manufacturers of and dealers in antiseptics, etc., Garden House, Wheathampstead, Herts. Increased £250,000 beyond the registered capital of £500,000.

J. A. Radley Research Institute Formed

The J. A. Radley Research Institute has been formed with a capital of £10,000 to promote all forms of pure research in chemistry, physics, etc. Management is vested in a governing body, first members of which are: Mr. Jack A. Radley, Mr. John S. Stanley, and Mr. Francis A. Lynne. Secretary of the new institute is Mr. E. J. S. Beckley. The registered office is at 23a Queen Victoria Street, Reading.

New Developments in Plastics

A symposium on 'New developments in plastics' will be held on Saturday, 11 February, at the Bradford Institute of Technology, Great Horton Road, Bradford 7, Yorks, commencing at 9.30 a.m.

Market Reports

GOOD CONTRACT CALL FOR INDUSTRIAL CHEMICALS

LONDON Most sections of the industrial chemicals market have reported a moderately active home trade with a satisfactory call against contracts. Export demand remains steady.

Prices for the most part have moved within narrow limits but lower quotations are ruling for the non-ferrous metal compounds. Copper sulphate is £1 per ton lower at £76 10s per ton, less 2% f.o.b. Liverpool, zinc oxide, white seal £100 per ton, green seal £98 per ton and red seal £95 per ton. Dry white lead, red lead and litharge are all £3 per ton below the prices given in the CHEMICAL AGE, 31 December.

There has been little change in the position of agricultural chemicals, but an increasing demand should be experienced for fertilisers in the immediate future. Most of the coal tar products are firm on a good demand.

MANCHESTER Trading conditions have been well back to normal. Prices generally are on a steady basis and only a few changes of any consequence have been reported. The leading industrial outlets for a wide range of products in the home section are calling for satisfactory deliveries against contracts, and a fairly steady movement of supplies on shipping account has been resumed. Additional business during the past few days has been on a moderate scale. Rather more active conditions are being experienced in fertiliser trade.

SCOTLAND There is very little to report from the Scottish heavy chemical market during the past week as due to the New Year holidays, conditions have been quiet. However, it is hoped soon for a return to normal trading conditions.

Monsanto

Why MONSANTO PHENOL outsells all others...

EXCELLENT TECHNICAL SERVICE...

Monsanto offers expert technical advice in connection with all bulk storage problems.

CONSISTENTLY HIGH QUALITY...

No other phenol offers a higher quality than Monsanto's. Synthetically produced, it has excellent colour and a high crystallizing point.

IMMEDIATE DELIVERY

A fast service ensures that your order for Monsanto Phenol is delivered in the shortest possible time. Monsanto also makes these chemicals for your industry: Santobrite (Monsanto sodium pentachlorophenate) Penta (Monsanto Pentachlorophenol)

We also welcome your enquiries for the following imported products which are manufactured by Monsanto Chemical Company, U.S.A:
Acrylonitrile, Santolite Resins, Hydrogenated Bisphenol A, Adipic Acid, "Santicizer" Plasticizers.

Write for more information

Santobrite, Santicizer and Santolite are Registered Trade Marks

Monsanto chemicals help industry—to bring a better future closer

Monsanto Reg.

MONSANTO CHEMICALS LIMITED

857 Monsanto House, Victoria Street, London, S W.1, and at Royal Exchange, Manchester, 2.

In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto Canada Limited, Montreal. Monsanto Chemicals (Australia) Ltd., Melbourne. Monsanto Chemicals of India Private Ltd., Bombay. Representatives in the world's principal cities.

TRADE NOTES

A. and W. Products List

Albright and Wilson (Mfg.) Ltd., General Chemicals Department, 1 Knightsbridge Green, London S.W.1, have issued a new general chemicals catalogue. Some 350 products are listed alphabetically giving code numbers and details of packages and physical form.

Water-soluble Copolymers

A new range of water-soluble copolymers of ethylene maleic anhydride developed by Monsanto Chemical Co. of U.S.A., will be marketed in the U.K. by Monsanto Chemicals Ltd. Applications for DX-840 resins, as they are called, includes thickeners for water-based paints and textile coatings and uses in the sizing and finishing of paper. The resins are also claimed to be excellent adhesives between polythene, glass, brick or other surfaces and water-permeable substances such as paper, and remain water-soluble after drying.

Dispersants for the paint, rubber and other industries, use as sand binder resin in foundry work are among other applications, while yet another springs from the excellent suspending action of the resins in water or emulsions.

Polythene Containers

Coinciding with the opening of their new factory, Fibrenyle Ltd., Skylon House, Park Royal Road, London N.W.10, have installed the first of three Blowmaster type 10 blow moulding machines. These machines are claimed to be the first of their kind to produce large polythene containers automatically and are capable of turning out containers of up to 9 in. dia. by 20 in. high.

Epikote Curing Agent

Shell Chemical Co. Ltd. have added two new products, Epikure RTH and accelerator RTA, to their range of curing agents for liquid Epikote resins, which are used in the engineering and electrical industries. Epikure RTH is a low viscosity, room temperature curing agent, which has been specially developed for use with Epikote 828 and 815. A feature of the new curing agent is that it may be used with varying proportions of accelerator RTA for the production of both castings and glass fibre reinforced laminates.

Controls for Hazardous Area

Data sheet FP from Elcontrol Ltd., Wilbury Way, Htichin, Herts, outlines the range of electronic control units which the company can supply either with certified intrinsically safe circuitry or in certified flameproof enclosures. Typical prices are also quoted.

Dust Collection

The Visco Engineering Co. Ltd., Stafford Road, Croydon, have issued a new brochure, No. 604, 'Visco Dust Collection', which supersedes previous publication No. 574, 'Modern Dust Collection'. The text has been revised and rearranged and new material includes a complete technical description of the Visco-Beth with pneumatic shaking gear together with dimensions and capacities, descriptions of the Cyclocell multi-tubular collector and the Visco-Handte wet type dust collector; while particulars of unit dust collectors for grinding and polishing machines, etc., are included.

Change of Address

Headquarters staff of Dow Agrochemicals Ltd. has now been moved to the plant site at North Lynn, King's Lynn, Norfolk. The only remaining department in London is public relations, which has been moved to 55-57 High Holborn, London W.C.1. (Holborn 4851.)

Metal Pre-treatment Compounds

Diversey (U.K.) Ltd., makers of specialised chemicals, are forming a Metal Industries Division which, starting 1 February, will handle the Diversey range of materials for the preparation of metals prior to further processing. These compounds are used in the pre-treatment of aluminium and aluminium alloys, particularly as a preparation for spot welding, anodising, conversion coating, electroplating, lacquering and vitreous enamelling. The new division will start by offering a range of seven products, Aluminux Nos. 17, 202, 514, 519, 600 and 808.

Mr. J. L. Edwards, who has specialised in metals pre-treatment with the Diversey Corporation (Canada) Ltd., leads this new Division.

New Q. & Q. Division

An advanced technical development unit designed to keep abreast of the expanding market for automation and instrumentation in laboratory apparatus is to be formed at Abingdon by Quickfit and Quartz Ltd., manufacturers of interchangeable laboratory glassware. Manager of the new division will be Mr. R. N. Jukes, who has previously been responsible for design of laboratory apparatus at the Stone (Staffs) factory.

People in the News

(*Continued from page 110*)

borough plant for the granulation of inorganic compound fertilisers (C.A., 29 September 1960, p. 506) was to Dr. Vyner's design.

● **Mr. David M. Woodford, M.A.,** and **Mr. Robert E. Bridgeford** have been appointed directors of Scott Bader and Co. Ltd., Wollaston, Wellingborough,

D. M. Woodford

R. E. Bridgeford

Northants. Mr. Woodford joined I.C.I. southern region in 1952 and was a representative in the organic chemicals department from 1953 to 1956 when he was transferred to the technical service department of Billingham Division. He joined Scott Bader in 1957 and became manager of the Polymer Division in 1958. Mr. Bridgeford joined Scott Bader in 1945 as a laboratory assistant and since 1948 has been senior chemist in the resin development laboratory.

● **Dr. T. White, B.Sc., Ph.D., F.R.I.C.,** director of research, Forestal Land, Timber and Railways Co. Ltd., and honorary editor, *Journal of the Society of Leather Trades Chemists*, has set up as an independent consultant advising on industrial research and development; technical writings and publication; leather and tanning chemistry; certain aspects of plastics and adhesives; corrosion; particle dispersal/flocculation/flotation and microbiology. His address is 'Highland', Wood End Road, Harpenden, Herts.

● **Mr. N. G. Lang** has retired as secretary of Woodall-Duckham and Woodall-Duckham Construction Co. Ltd. after more than 40 years service. **Mr. L. Wignall** has been appointed secretary of both companies.

● **Mr. F. G. Hughes** has been appointed southern sales manager from 2 January in the London office of Robert Dempster and Sons Ltd., of Elland, at 57 Tufton Street, S.W.1.

● **Mr. N. Daniel, B.Sc.(Lond.), F.R.I.C.,** who has been assistant general manager of Semtex Ltd., the Dunlop subsidiary, for the past 18 months, will shortly take over the post of general purchasing manager for the Dunlop Group. He succeeds **Mr. D. J. Flunder,** who is taking up a senior position in the Tyre Division.

● **Mr. R. E. J. Putman, A.M.I.Mech.E.,** has now rejoined James Gordon and Co. Ltd., Dalston Gardens, Stanmore, Middlesex, as chief engineer, after having spent several years in England and Canada engaged on the application and development of electronic control equipment and systems for power stations, sugar factories, oil fields, etc.

● **Mr. R. D. Dale** will resign from the boards of Brandhurst Co. Ltd., Chemicovens Ltd., and the Chemical Service Co. Ltd. on 31 January. From 1 February he becomes managing director of Fergusson Wild and Co. Ltd., ore importers etc., 3 St. Helens Court, London E.C.3.

NANSA SS

NEWEST ANIONIC FOR LIQUID DETERGENTS

The Nansa SS series is based on the newest type of dodecyl benzene, sulphonated with SO_3. It is far more soluble—permitting the high active concentrations required for liquid detergents—often dispensing with solubilisers.

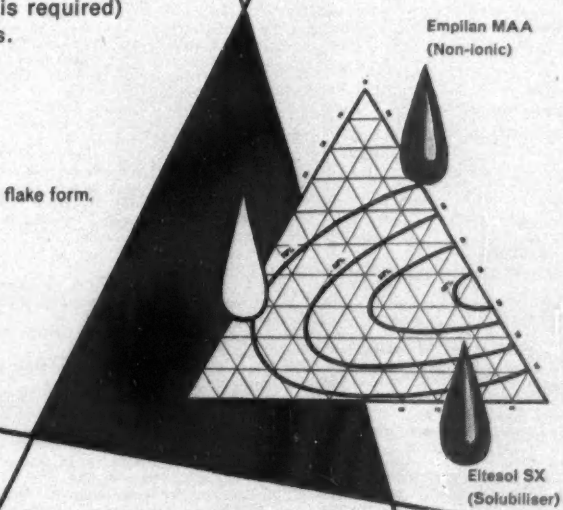
The series also contains less sodium sulphate than conventional sulphonates, leading to improved cold storage properties, especially in high active liquid formulations. It is fully compatible with all anionic and non-ionic surfactants and conventional foam stabilisers . . . particularly with our Empilan MAA and (where solubiliser is required) with Eltesol SX and other hydrotropes.

THE NANSA SS SERIES CONSISTS OF:

NANSA SS ACID—
95% active dodecyl benzene sulphonic acid.

NANSA SS 60 PASTE—
60% active sodium salt of NANSA SS Acid.

NANSA SS 90—
90% active sodium salt of NANSA SS Acid in flake form.



Marchon

Marchon Products Limited, Whitehaven, England.

Member of the Albright & Wilson Group of Companies.

Manufacturers of bases and additives for every type of domestic and industrial detergent.

RAB 196

57

NEW PATENTS

By permission of the Controller, H.M. Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

On Sale 15 February

Ion-exchange materials. Ionics Inc. 720 002
High molecular weight polyethylenes. Ziegler, K. 829 627

ACCEPTANCES

Open to public inspection 22 February

Derivative of toluene-3:4-dithiols and methods of preparation and use thereof. Clark, R. E. D. 861 571
Treatment of graphite. United Kingdom Atomic Energy Authority. 861 376
Polymerisation of organic compounds. Dunlop Rubber Co. Ltd. 861 438
Basic esters. Beecham Research Laboratories Ltd. 861 377
Process for the manufacture of azo pigments. Ciba Ltd. 861 443
Process for polymerising olefins. Farbwerke Hoechst AG. 861 444
Process for improving polyolefins. Farbwerke Hoechst AG. 861 446
Process for obtaining elastomers with high elastic characteristics from copolymers of ethylene with α-olefins. Montecatini. 861 542
Pressure-packed polymerisable materials. Boe, C. F., and Osipow, L. I. 861 448
Glass compositions. Compagnie de Saint-Gobain. 861 449
11-Cis isomers of the vitamin A series. Oroshnik, W. 861 450
Manufacture of steroids. Upjohn Co. 861 470
Steroids and the manufacture thereof. Upjohn Co. 861 471
Reaction products of epoxidised oils. Boake Roberts & Co. Ltd., A. 861 778
N-arylmaleamic acids and the manufacture of α-di-(arylazolyl)-ethylene derivatives. Ciba Ltd. 861 472
Heterocyclic compounds and a process for the manufacture and conversion thereof. Roche Products Ltd. 861 524
Quinolizines and a process for the manufacture thereof and the conversion thereof into other compounds. Roche Products Ltd. 861 525
Manufacture of butyraldehyde and a catalyst therefor. Farbwerke Hoechst AG. 861 475
Optical brightening triazolyl stilbenes, their production and use. Geigy, AG, J. R. 861 451
Process for the production of olefine polymerisation catalysts, and the use of these catalysts in the polymerisation of olefines. Ziegler, K. 861 452
1-cinnamyl piperidine derivatives. Merck & Co. Inc. 861 559
N-substituted piperidines. Merck & Co. Inc. 861 560
Preparation of spinning solutions of cellulose triacetate. Celanese Corporation of America. [Addition to 779 220.] 861 453
Manufacture of graft copolymers. B.X. Plastics Ltd. 861 454, 861 455
Peracetic acid treatment of vulcanised rubber. Food Machinery & Chemical Corporation. 861 660
Piperazino derivatives and methods for their manufacture. Scherico Ltd. [Addition to 833 473.] 861 779
Vat dyestuffs of the acedianthrone series and process for their manufacture. Ciba Ltd. 861 758
Process for the manufacture of $\beta:\beta:\beta$-trichloro-α-hydroxy ethyl phosphonic acid diakyl esters and/or dichlorovinyl phosphoric acid dialkyl esters. Farbenfabrik Wolfen Veb. 861 780
Production of compositions from glyoxal and alkali metal silicates. Nobel-Bozel. 861 378
Pharmaceutical compositions having antidiabetic activity. Abbott Laboratories. 861 781
Pharmaceutical compositions having muscle relaxant activity. Abbott Laboratories. 861 782
Pharmaceutical compositions having tranquilizing activity. Abbott Laboratories. 861 783
Process of preparing tetraaryl tin compounds. Farbwerke Hoechst AG. 861 459
Pharmaceutical compositions. Imperial Chemical Industries Ltd. 861 526
Zone refining process. Centre National De La Recherche Scientifique. 861 479
Therapeutic compositions comprising 1:2-benzisothiazolone derivatives. Imperial Chemical Industries Ltd. 861 379
Compositions containing cycloheximide. Upjohn Co. 861 389
Process for the manufacture of phosphoric acid esters and piperazine and morpholine derivatives. Ciba Ltd. 861 463
Antibiotic compositions and methods of preparing them. National Drug Co. 861 351
Salts of penicillins. Imperial Chemical Industries Ltd. 861 527
Process for the production of metallic or metalloid borides on the surface of metals. Metallic Surfaces Research Laboratories Ltd. 861 644
Synthetic linear polyamides. British Nylon Spinners Ltd. 861 354
Substituted amino alcohols. Robins Co. Inc., A. H. 861 360
Substituted phenol. British Oxygen Co. Ltd. 861 792
Preparation of organic aluminium compounds. Hardman & Holden Ltd. 861 595
Hydrocarbon liquids having increased electrical conductivity. Bataafse Petroleum Maatschappij NV. 861 794
Epoxy resin compositions. General Mills Inc. [Addition to 854 927.] 861 796
Method for producing borides. United States Borax & Chemical Corporation. 861 743
Combined isomerisation and alkylation process. Esso Research & Engineering Co. 861 797
Integral mixtures of photographic gelatine emulsions and polyvinyl alcohol. Grunwald, H., and Perkins, L. 861 396
Manufacture of a steriod. Lepetit S.p.A. 861 799
Production of boron compounds. Imperial Chemical Industries Ltd. 861 760
Ion-exchange resins. Permutit Co. Ltd. 861 397
Compounds containing boron and nitrogen and method of producing same. American Cyanamid Co. 861 401
Production of boric acid. United States Borax & Chemical Corporation. 861 416
Organic phosphoramidates. Dow Chemical Co. 861 402
Method for the manufacture of O-aryl O, O-di-(lower-alkyl) phosphorothioates. Dow Chemical Co. 861 406
Organic acids and a method of producing same. Sorm, F., and Farkas, J. 861 418
3 : 4-dihydro-1 : 2 : 4-benzothiadiazine-1 : 1-dioxides. Ciba Ltd. 861 367
Process for preparing esters and polyesters of di-carboxylic acids and glycols. Goodyear Tire & Rubber Co. 861 712
Lower alkyl esters of 1-(2¹, 3¹-dichloropropyl)-4-carboxy-2-pyrrolidone and process for their preparation. Pfizer & Co., Inc., C. 861 370
Process for the preparation of cyclopentadienyl manganese tricarbonyl compounds. Ethyl Corporation. 861 371
Process for the production of *bis* (*p*-hydroxyaryl)-aryl acetonitriles. Farbenfabriken Bayer AG. 861 372
Process for partially oxidising organic compounds. Esso Research & Engineering Co. 861 373
Substituted phenothiazenyl piperazines. Morren, H. 861 420
Mercapto-terminated liquid polymer. Thiokol Chemical Corporation. 861 425
Polymeric dispersions and method of coating therewith. Koppers Co. Inc. 861 427
Indole derivatives. Searle & Co., G. D. 861 428
Production of benzimidazole derivatives. Ciba Ltd. 861 431
Recovery process for acetylene and other gases. Kellogg Co., M. W. 861 496
Production of polymeric linear terephthalate ester films. Du Pont De Nemours & Co., E. I. [Addition to 851 875.] 861 636
Cracking of hydrocarbons. Badische Anilin- & Soda-Fabrik AG. 861 498
Production of adamantane. Du Pont De Nemours & Co., E. I. 861 435
Fluorophenarsazines and anti-fouling paints containing them. Osaka Kinsoku Kogyo Co. Ltd. and Kansai Paint Co. Ltd. 861 500
Method of separating air into oxygen and nitrogen. Sulzer Freres S.A. 861 540
Method of chlorination of polyolefins. Hercules Powder Co. 861 595
Polymeric film with an acid and a drying oil therein. Esso Research & Engineering Co. 861 412
Protein derivatives. Agfa AG. 861 414
N-substituted piperidines. Merck & Co. Inc. [Divided out of 861 560.] 861 561
Derivative of toluene-3:4-dithiol and methods of preparation and use thereof. Clark, R. E. D. [Divided out of 861 571.] 861 572, 861 573
Thioxanthene derivatives and salts thereof and a process for the manufacture of same. Hoffmann-La Roche & Co., AG, F. [Divided out of 18 512/57.] 861 521

DIARY DATES

MONDAY 16 JANUARY

S.C.I.—Leeds: Houldsworth School of Applied Science, 7 p.m. Scientific film show.
S.C.I.—London: 14 Belgrave Sq., S.W.1, 5.30 p.m. 'Pesticides & the public', by Dr. Hubert Martin.
S.C.I.—London: 14 Belgrave Sq., S.W.1. Scientific film show.
Inst. Physics & Phys. Soc.—London: R.H.S. Old & New Halls, S.W.1. Forty-fifth Physical Society Exhibition, until 20 January.

TUESDAY 17 JANUARY

C.S.—Dundee: Chemistry Dept., Queen's Coll., 5 p.m. 'C-Nitroso compounds, kinetic & structural studies', by Dr. B. G. Gowenlock.
C.S.—Nottingham: Univ. Chem. Dept., 5 p.m. 'Some aspects of natural product chemistry', by Sir Alexander Todd.
Fertiliser Soc.—London: Burlington Hse., Piccadilly, W.1, 2.30 p.m. 'Current fertiliser practice in relation to manurial requirements', by Dr. D. A. Boyd.
Plastics Inst.—London: Wellcome Bldg., Euston Rd., N.W.1, 6.30 p.m. 'Newer ways of making polymers', by N. Kaufman.

WEDNESDAY 18 JANUARY

I.Chem.E.—Leeds: Lecture Theatre A, Houldsworth School of Applied Science, Reservoir St., 6.30 p.m. 'Chemical process design', by Prof. J. M. Coulson.
Plastics Inst.—Stockton-on-Tees: 'Plastics in building', by V. H. Westworth.
R.I.C.—London: King's Coll., Strand, W.C.2, 6.30 p.m. 'Aspects of chemistry of living cells', by Prof. Sir Cyril Hinshelwood.
S.C.I. with O.C.C.A.—London: Manson Hse., 26 Portland Pl., W.1, 7 p.m. 'Use of surface active substances in paint & printing industries', by Dr. W. Carr.
S.C.I.—London: 14 Belgrave Sq., S.W.1, 6 p.m. 'Metallic diffusion coatings', by R. L. Samuel.

THURSDAY 19 JANUARY

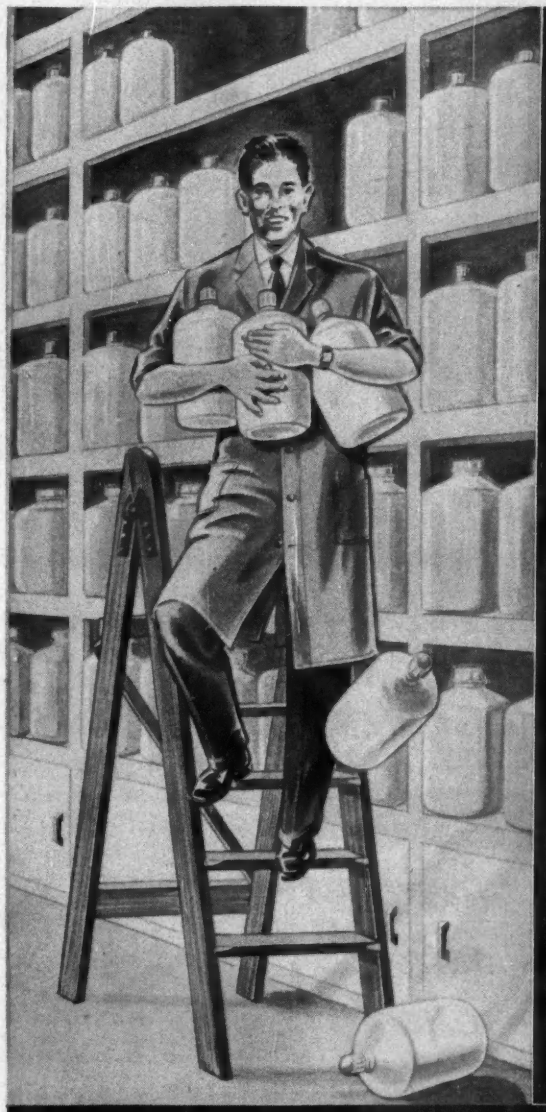
C.S. with R.I.C. & S.C.I.—Aberdeen: Univ. Chem. Dept., 8 p.m. 'Production of phosphoric acid & ammonium-based fertilisers', by Dr. J. S. S. Reay.
C.S.—Aberystwyth: Edward Davies Chemical Labs., Univ. Coll., 5 p.m. 'Research in gas kinetics', by Prof. A. F. Trotman Dickenson.

FRIDAY 20 JANUARY

C.S.—Glasgow: Royal Coll. of Science & Tech., 3.30 p.m. 'Co-ordination chemistry of some organo-metallic compounds', by Prof. G. E. Coates.
Plastics Inst.—Manchester: Textile Inst., 10 Blackfriars St., 6.45 p.m. 'Trends in the plastics industry—a general survey', by C. W. Welsh.
Soc. for Visiting Scientists—London: 5 Old Burlington St., W.1, 7.30 p.m. Discussion mtg. on 'Atmospheric pollution', under chairmanship of Dr. R. Lessing.
S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.30 p.m. 'Chemistry of macrocylic antibiotics', by Dr. M. C. Whiting.

Labelling of Medicinal Preparations

A memorandum on the labelling procedure for compounded medicinal preparations has been issued by the Association of British Pharmaceutical Industry, the Proprietary Association of Great Britain and the Association of Public Analysts. The memorandum gives labelling recommendations as well as a detailed list of definitions.



What ever did we do before changing to

Freeflex

blown polythene standard bottles and jars?

Breakages, heavy transport costs, the trouble of credits for empties are things of the past when you turn to the "FREE-FLEX" Blown Polythene Container Range. "FREE-FLEX" are already serving a wide field of industry including, Heavy Chemicals, Fine Chemicals, Pharmaceuticals, Paints, Dyes, Varnishes, Waxes, etc. making for lighter and safer handling. "FREE-FLEX" certainly lighten your packaging problems. Manufactured in a range of standard sizes, in Normal and High Density Grades

from 5c.c. to 5 gals.

If you wish to learn more as to how "FREE-FLEX" can help you, write us at once.

The right kind of Closure . . . . . .

We manufacture an extensive range of SUBA-SEAL CLOSURES in rubber and other materials to meet your every requirement: If you have a closure problem, our twenty four years experience can help you. Write us today for further information.

SUBA-SEAL

POSITIVE CLOSURES

WILLIAM FREEMAN AND COMPANY LIMITED
SUBA-SEAL WORKS . STAINCROSS . BARNSLEY . YORKSHIRE
Telephone 4081

PHENOL,
CRESYLIC ACID,
ORTHO CRESOL,
META CRESOL,
Refined
NAPHTHALENE

TOLUOLE,
SOLVENT NAPHTHA,
XYLOLE, PYRIDINE

CYCLOHEXANOL.
CYCLOHEXANONE,
METHYL
CYCLOHEXANOLS,
METHYL
CYCLOHEXANONE,
ESTERS OF
CYCLOHEXANOL Etc.

Made by

BRITISH TAR PRODUCTS LTD.

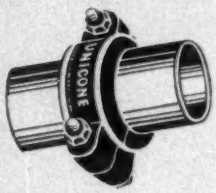
Sales Office : **418a GLOSSOP ROAD, SHEFFIELD, 10.**

TELEPHONE: 60078-9 TELEGRAMS: CRESOL, SHEFFIELD, 10

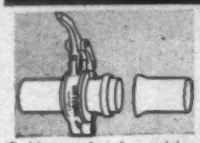
Ocean Storage installation with berth at Partington Coaling Basin, Manchester Ship Canal.

INSTANTANEOUS JOINTS

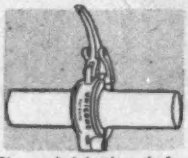
Leakproof. safe . . . reliable!



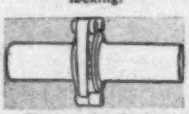
For permanent or semi-permanent pipelines 'UNICONE' bolted pipe joints are employed.



Rubber gasket in position and joint ready to pull over.



Pipe ends joined ready for locking.



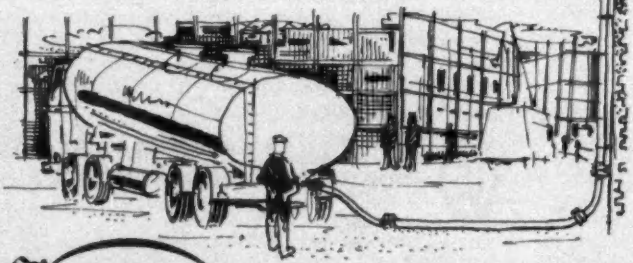
The completed joint.

For temporary pipe lines 'Unicone' instantaneous joints are recommended. Comprising two parts only, they fasten with a "snap" ensuring a perfect seal in a matter of seconds.

For permanent or semi-permanent pipe lines, 'Unicone' bolted type joints are usually employed and can be assembled far more quickly than any other flexible joint giving positive anchorage.

A perfect joint in a matter of seconds...

The 'Unicone' system of pipe-jointing, with its time and labour saving features, produces a pipe line which is flexible while remaining absolutely leak-proof.

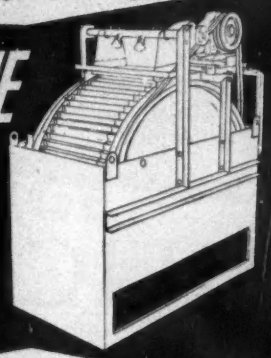


'UNICONE' Flexible Joints for Pipelines

THE UNICONE CO., LIMITED
RUTHERGLEN, GLASGOW, SCOTLAND

now available —

FOR THE FIRST TIME



A PACKAGED INDUSTRIAL SCREENING UNIT
for continuously removing solids from water.
No civil works necessary

* FULLY AUTOMATIC * SELF CONTAINED
* TRANSPORTABLE * SEVERAL SIZES * SUITABLE FOR MOST INDUSTRIAL AND PUBLIC SERVICE APPLICATIONS

TECHNICAL ADVISORY SERVICE AVAILABLE
Write for details—now: Patent applied for

F. W. BRACKETT & CO LTD
COLCHESTER ENGLAND
Telephone: COLCHESTER 73958 Telegrams: BRACKETT COLCHESTER
P 5865

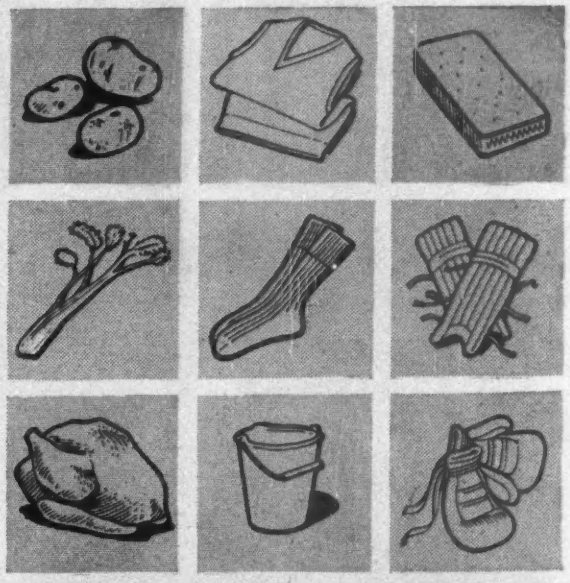
ELECTRIC FURNACES

500°C/1750°C
For research and production

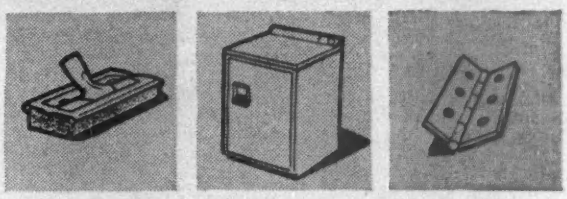
TUBE
MUFFLE
CRUCIBLE
CONTINUOUS
TROLLEY
SPHERICAL
ROTARY

Many standard sizes
Special sizes and design a feature of our work

R. M. CATTERSON-SMITH LIMITED
EXHIBITION GROUNDS WEMBLEY
Telephone: WEMBLEY 4291
MAKERS OF ELECTRIC FURNACES FOR OVER 35 YEARS



Pack your product in 'Spescopaks'



—for faster sales and larger profits

'Spescopaks' are made from high-clarity 'Visqueen' polythene film. That means they are not only economical, but tough, flexible, waterproof and hygienic.

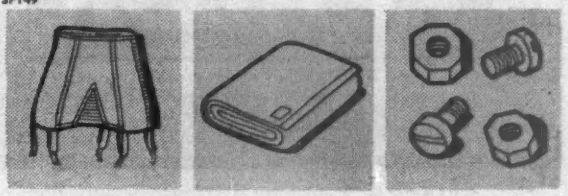
You'll find the unrivalled experience and resources of Spesco Developments Ltd., invaluable to your business. Spesco are one of the largest polythene converters in the United Kingdom, and helped to pioneer the adoption of polythene film in the packaging industry. They are specialists in the manufacture of carton, sack or drum liners for chemical and food trades.

Spesco offers you

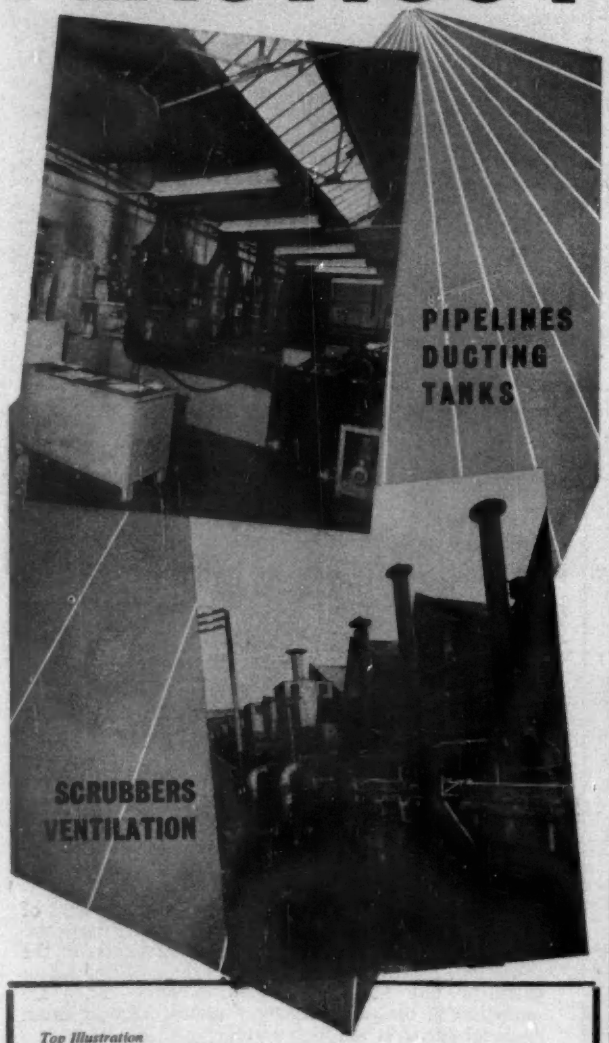
★ Skilled technical service
★ Unrivalled experience and know-how
★ Top-quality packaging
★ Speedy deliveries
★ Highly competitive prices
★ Superb multi-colour printing
★ Shaped or novelty bags to order
★ Vast range of bag sizes flat and gusseted – plain or printed

Let Spesco create an individual pack for your product

Write now for samples and quotations to
Spesco Developments Ltd., Hanworth Lane, Chertsey or Tel: Chertsey 3411
SP149



PLASTICS?



Top Illustration
Fabricated for the Decca Record Co. Ltd. on behalf of Sturtevant Eng. Co. Ltd
Lower Illustration
Fume extraction plant for The General Electric Co. Ltd.

★ ACID RESISTING CONSTRUCTION
★ PLASTIC FABRICATION AND RESIN COATINGS

Specify -

ACALOR

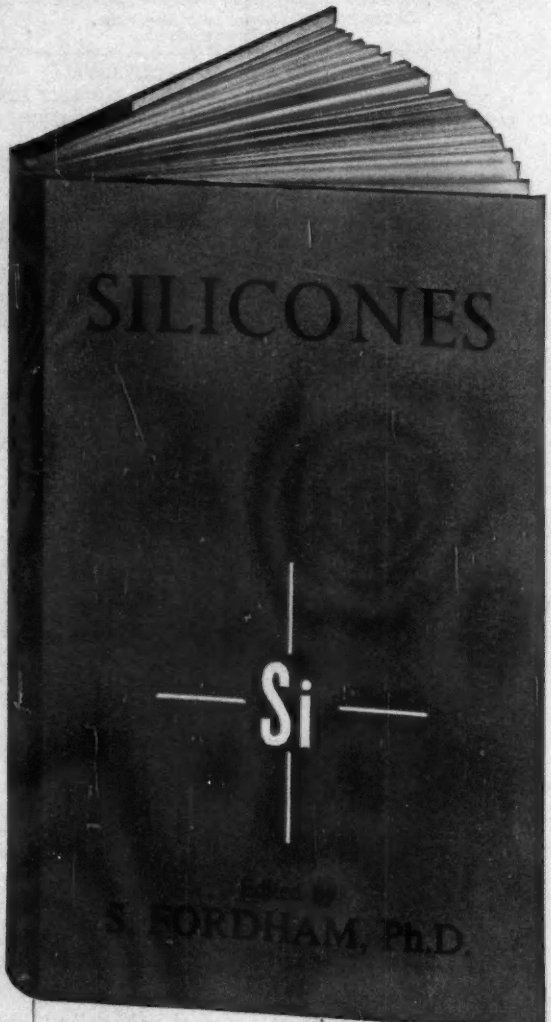
THE CORROSION SPECIALISTS
ACALOR (1948) LTD.
KELVIN WAY, CRAWLEY, SUSSEX. Tel. Crawley 1571 (3 lines)

The writers have drawn on their experience in the Silicones and Research Departments of I.C.I.

SILICONES

Just Published

Edited by
S. FORDHAM, Ph.D.



A condensed, fully documented account of organosilicon chemistry together with a systematic treatment of manufacturing processes and applications. Illustrated by eight half-tone plates and many line diagrams. Index.

36s. net

From all booksellers or in case of difficulty at 37s. 3d. by post from George Newnes Limited, Tower House, Southampton St., London, W.C.2.

NEWNES

STURGE means fine chemicals

Since 1823, John & E. Sturge Limited have produced fine chemicals for industry. The quality and consistency of these basic Sturge chemicals help to ensure high standards in end-products as diverse as toothpaste and paint.

PRECIPITATED CALCIUM CARBONATE

ACTIVATED CALCIUM CARBONATE

CITRIC ACID and other chemicals from mould fermentation

TARTRATES AND CITRATES

POTASSIUM BICARBONATE

LUMINESCENT QUALITY CHEMICALS

JOHN & E. STURGE LTD

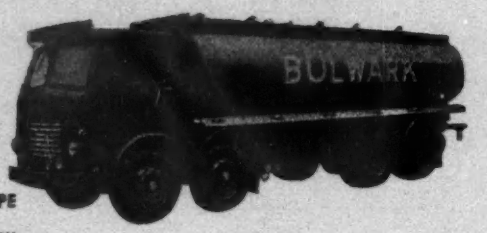
WHEELEYS ROAD, BIRMINGHAM 15

TELEPHONE: MIDLAND 1236

AN INDEPENDENT COMPANY
MANUFACTURING FINE CHEMICALS SINCE 1823

For Bulk Liquid Transport consult

DEPOTS AT
LONDON,
GLOUCESTER,
WARRINGTON,
MANCHESTER,
STANFORD-LE-HOPE
and SOUTHAMPTON



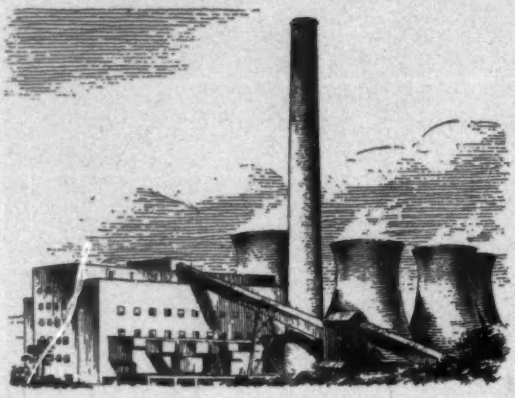
BULWARK

the Specialists

- Fleet of over 350 tankers, suitable for most commodities, capacities from 1000 to 4000 gallons. Write for brochure and quotation.

BULWARK TRANSPORT LTD.
CHIPPENHAM WILTS *TELEPHONE · 2846/7/8*
LONDON OFFICE
17 STRATTON ST., W.1 *TELEPHONE · GRO 7943*

DAVENPORT
ENGINEERING CO., LIMITED
BRADFORD



WATER COOLING
SPECIALISTS

Fire Prevention Standard Recommendations

THIS SYSTEM OF STANDARD RECOMMENDATIONS for fire prevention was devised by the Kent County Brigade.

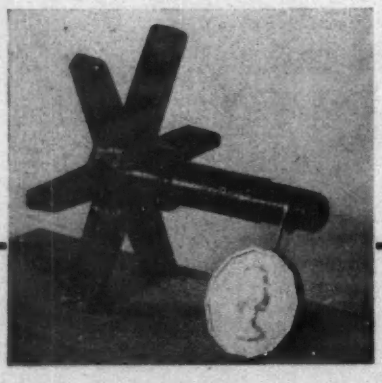
'..... streamlines paper work in the preparation of fire prevention reports'. **Municipal Journal**

'..... intelligent standardization of form and wording makes for more efficient work all round'. **T.L.S.**

8d. 6s. [*postage paid*]

Published by
ERNEST BENN LIMITED
Bouverie House . Fleet Street . London . EC4

★ ★

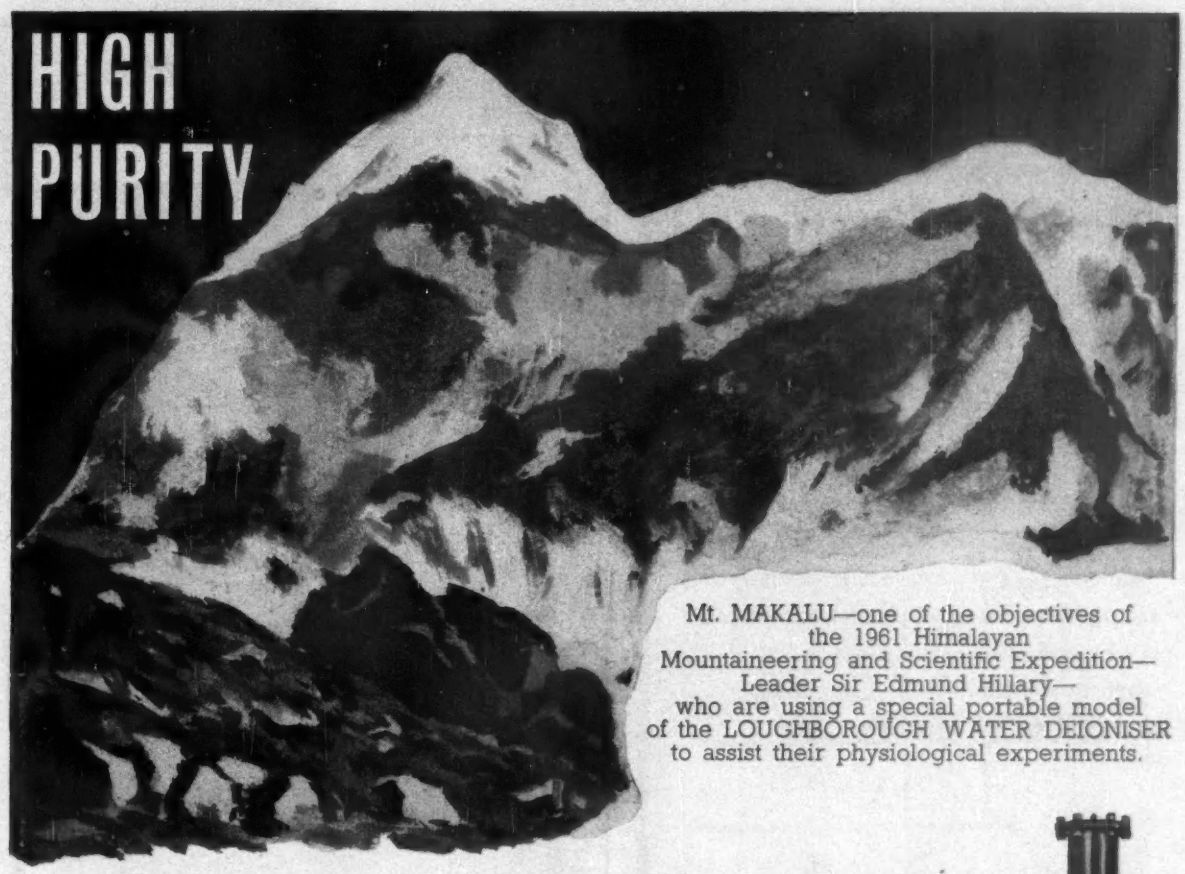


Bronze impeller fitted with hard surfaced stainless steel sleeve .5" dia. × .312" long life increased to 1500 hours pumping chlorinated hydrocarbon insecticide. We can supply sleeves or spindles for your pumps to give equally improved life.

Full details upon application to

A. S. YOUNG & CO. LTD.
TOWER WORKS, WOODSIDE LANE, LONDON, N.12.
HILLSIDE 6606/7

HIGH PURITY



Mt. MAKALU—one of the objectives of the 1961 Himalayan Mountaineering and Scientific Expedition—Leader Sir Edmund Hillary—who are using a special portable model of the LOUGHBOROUGH WATER DEIONISER to assist their physiological experiments.

FOR HIGH PURITY WATER

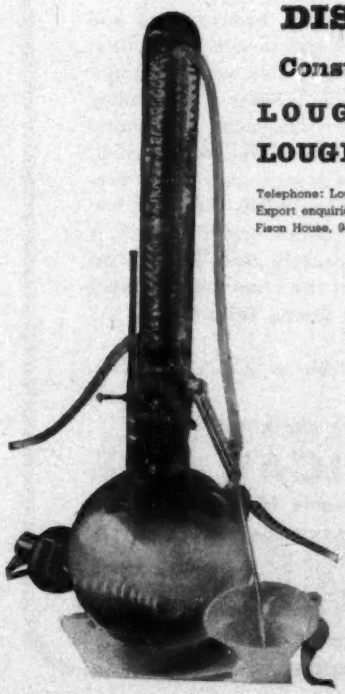
by

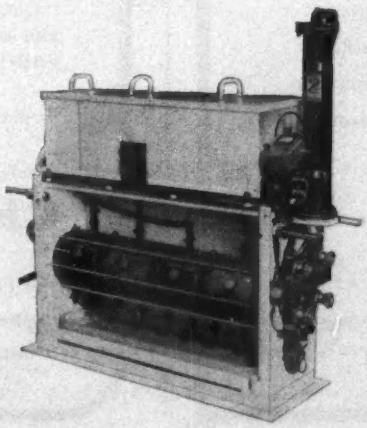
DISTILLATION or DEIONISATION

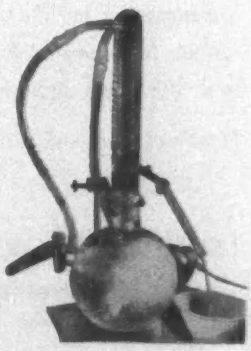
Consult:

LOUGHBOROUGH GLASS COMPANY Ltd.,
LOUGHBOROUGH, LEICESTERSHIRE, ENGLAND

Telephone: Loughborough 4881 Telegrams: Glass-Telex-Loughborough Telex: 34-629
Export enquiries to: Fisons Chemicals (Export) Ltd.,
Fison House, 95 Wigmore Street, London, W.1.







U1/1

Ready now

Name Index of Organic Reactions

J. E. GOWAN, M.Sc., Ph.D.,
and T. S. WHEELER, D.Sc., M.R.I.A.

FIRST EDITION 1961

To combat the obscurity caused by the practice of naming reactions after their discoverer, the authors have indexed 739 named organic reactions, describing the nature of each, and giving references which will supply further information. Indispensable to all who read the literature of organic chemistry.

50*s. net*

Physical Chemistry for Students of Pharmacy and Biology

S. C. WALLWORK, M.A., D.Phil.

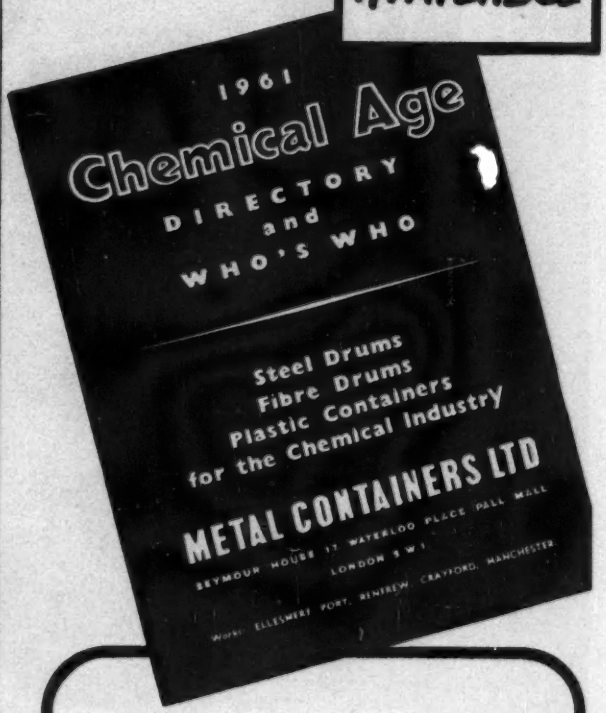
SECOND EDITION 1960

In the new edition much has been revised and expanded, but the treatment is still suitable for both students and teachers who have little or no mathematical background.

Paperback Students' Edition 18*s. net*

LONGMANS, GREEN & CO. LTD.
6 AND 7 CLIFFORD STREET, LONDON W.1

NOW AVAILABLE



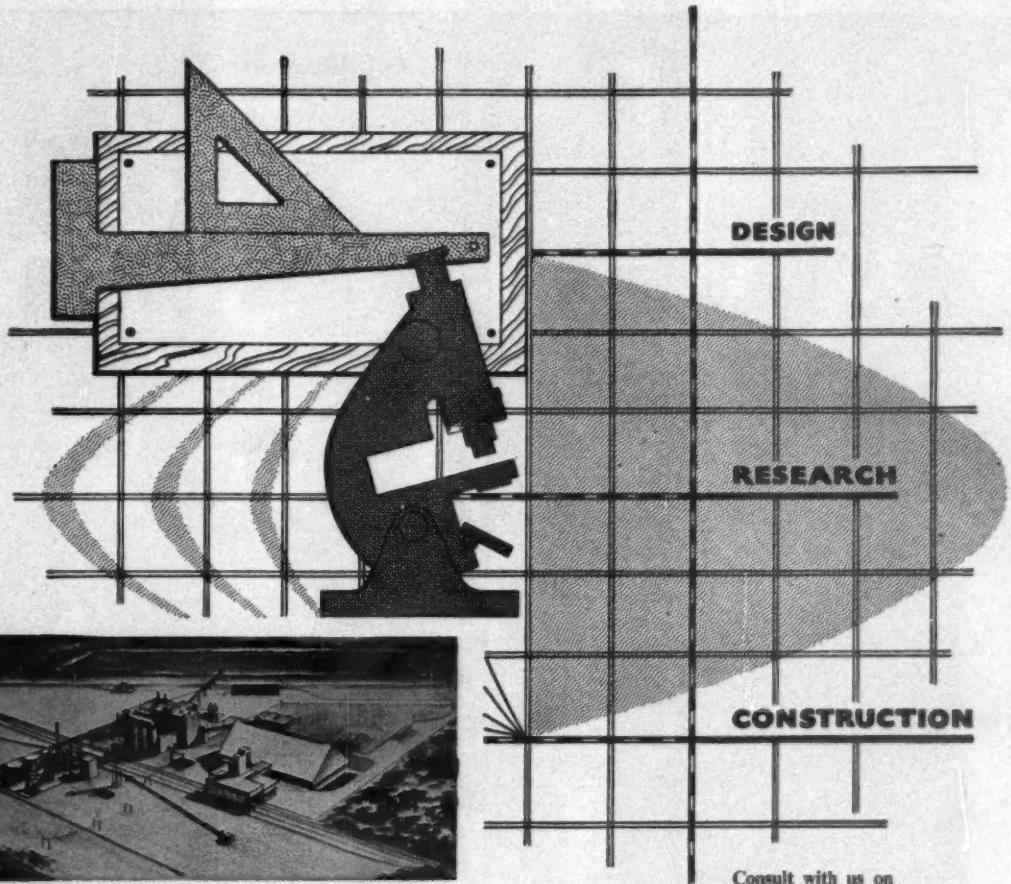
—an invaluable work of reference to all concerned with the manufacture or use of chemicals, chemical engineering and chemistry.

The 1961 edition has been revised and considerably increased in size. In addition to a Who's Who section which contains biographical details of over 4,000 leading personalities in Chemicals, Chemical Engineering and Chemistry, and a Buyers' Guide listing the manufacturers and suppliers of more than 4,000 chemicals and items of chemical processing equipment, it includes **a completely new feature on the structure of the chemical industry entitled "Who Owns Whom".**

Copies are available at £2 2s. 0d. each.

For further details please write:

CHEMICAL AGE
Bouverie House,
154 FLEET STREET, LONDON, E.C.4
or telephone :
FLEET STREET 3212



DORR-OLIVER COMPANY LIMITED

is the British section of a world-wide organization specializing in the design and manufacture of plant and equipment for all processes where the separation of fine solids from liquids is required.

Consult with us on your problems concerning —

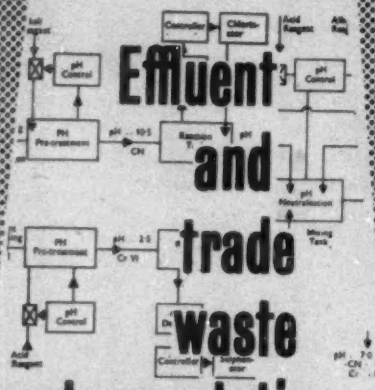
AGITATION
CLASSIFICATION
CLARIFICATION
THICKENING
VACUUM AND PRESSURE FILTRATION
EFFLUENT PURIFICATION
SAND AND ACID PUMPING
FLUIDIZED BED SYSTEMS
MIXING, ETC.

For information write to:

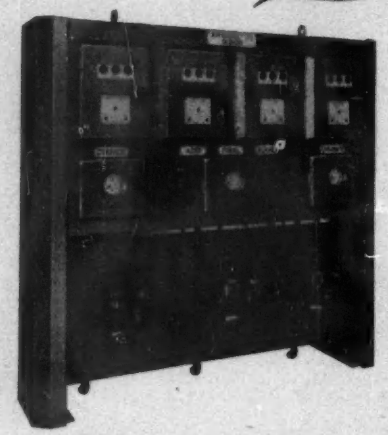
Dorr-Oliver Company Limited, Norfolk House, Wellesley Road, Croydon, Surrey

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT



Effluent and trade waste instrumentation BY Lock



AUTOMATIC CONTROL for

pH neutralisation of effluent
also
Rapid continuous detoxication of trade waste containing cyanide and chromate

Lock INSTRUMENTATION
NUCLEAR
CHEMICAL
ELECTRONIC

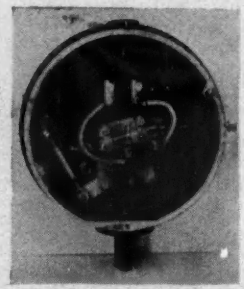
A. M. LOCK & CO. LTD.
INSTRUMENTATION ENGINEERS
79 UNION STREET
OLDHAM LANCASHIRE
Tel: MAin 6744.

CW.7747

CROMIL & PIERCY LTD.

GRAPHITE IN ALL FORMS

MILBURN HOUSE
"E" FLOOR
NEWCASTLE-ON-TYNE
Tel: 2-7761



PRESSURE GAUGES

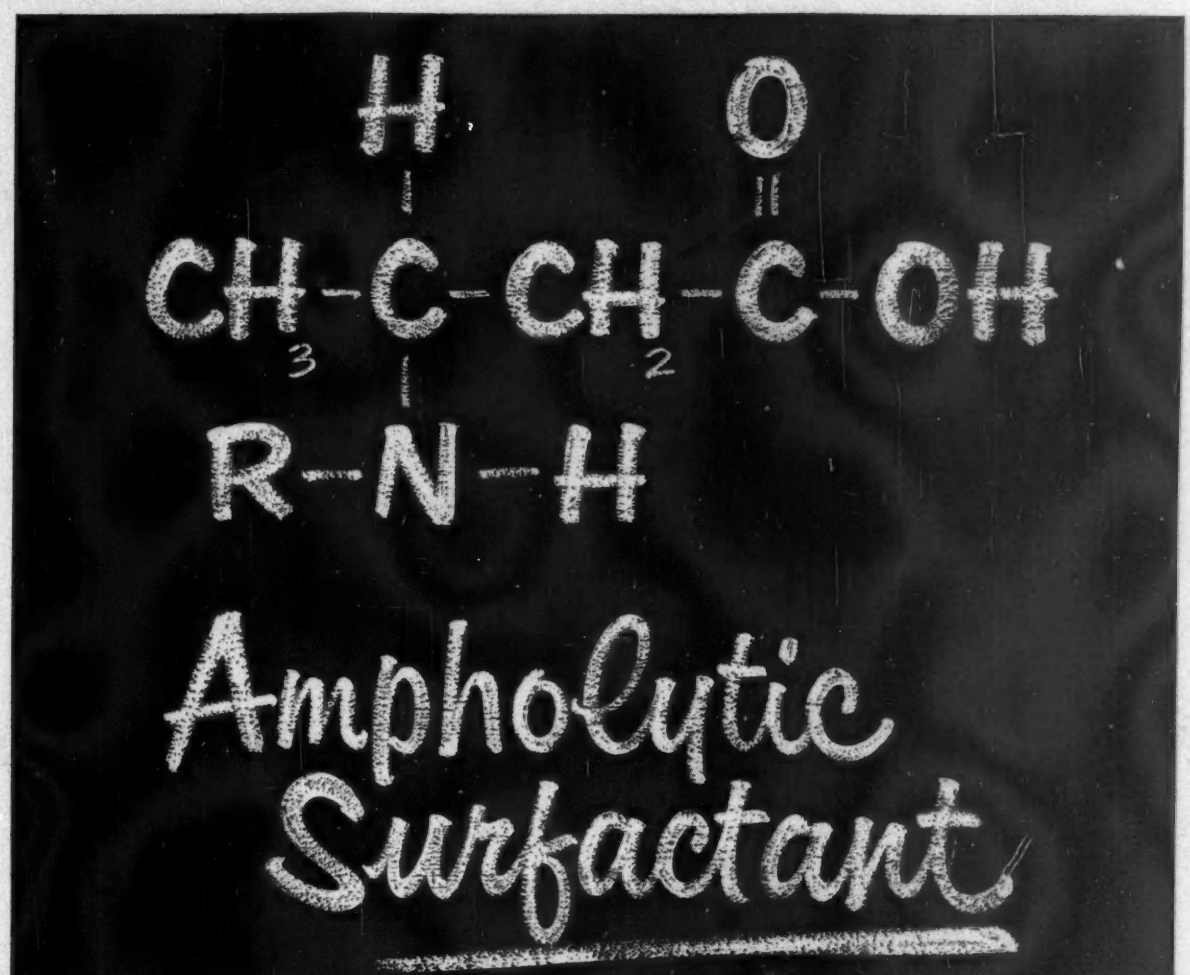
- INSTRUMENT REPAIRS (ALL TYPES)
- A.I. AFTER SALES SERVICE
- LIGHT ENGINEERING
- MERCURY SWITCH PRESSURE CUT-OUTS (for operation at various pressures)

Manufactured by
A. W. INSTRUMENTS (GUILDFORD) LTD.
2 WALNUT TREE CLOSE, GUILDFORD, SURREY TEL: GUILDFORD 5799

COPPER PLANT for the CHEMICAL TRADE

Established 1825
BLUNDELL & CROMPTON
LIMITED
WEST INDIA DOCK ROAD
LONDON, E.14
Phone: East 3838 (3 lines) 1408 & 4160
Grams: Blundell Phone London

STILLS
RECTIFYING COLUMNS
CONDENSERS
Autoclaves . Calandrias
Vacuum Pans . Boiling Pans
Pipework . Coils . Etc.



ARMEEN Z

Available in drums and tankers

ARMEEN Z is a 55% active aqueous gel with a specific gravity of 0.9, melting to a clear liquid at 50°C. It is soluble in polar solvents and dispersible in carbon tetrachloride, chloroform, benzene, and xylene. Armeen Z is a powerful bactericide and is compatible with cationic, anionic, and nonionic surface active chemicals.

ARMEEN Z and its alkali salts are used in pigment softening, as disinfectants, corrosion inhibitors, in sanitizing detergents, shampoos, cosmetics, synthetic latices, and there are many applications yet to be developed. Ask for Technical Bulletin L-19.

ARMOUR—THE BIGGEST NAME IN CATIONICS

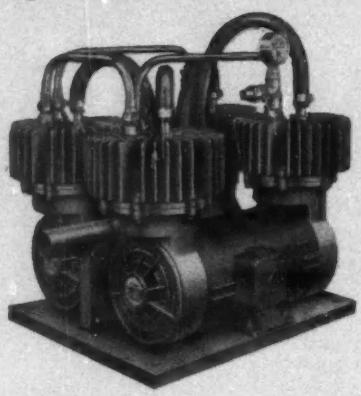
ARMOUR HESS CHEMICALS LIMITED

DISTEC

6 ARLINGTON STREET · ST JAMES'S · SW1. TELEPHONE: HYDe Park 7831

COMPTON
DIAPHRAGM COMPRESSORS

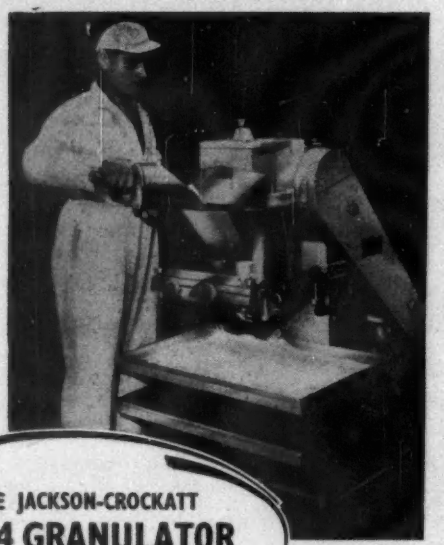
- OIL-FREE AIR SUPPLIES
- CLOSED CIRCUIT APPLICATIONS



LABORATORY AIR & VACUUM PUMPS
NO CONTAMINATION BY LUBRICATING OIL
NO LEAKAGE PAST SHAFT SEALS OR PISTONS

Write for details of complete range

DAWSON, McDONALD & DAWSON LTD
COMPTON WORKS · ASHBOURNE · DERBYSHIRE
TELEPHONE & TELEGRAMS: ASHBOURNE 113



THE JACKSON-CROCKATT
No. 4 GRANULATOR
for moist or sticky powders prior to tableting etc.

Also Filling Machines, Granulators for dry materials, and Lidding Machines.

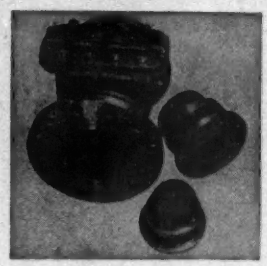
ROBUST & DURABLE—supplied with Stainless Steel parts where in contact with the material being granulated. Long life of the mesh is guaranteed.
EFFICIENT, DEPENDABLE, EASILY CLEANED—all parts working on the material being granulated can be easily and quickly dismantled without the use of spanners.
QUIET IN OPERATION—all gearing is enclosed in oil bath.
All users are highly delighted with the performance and convenience of this machine.

J. G. JACKSON & CROCKATT LTD.
NITSHILL ROAD, THORNLIEBANK, GLASGOW.
Tel: GIFfnock 0391 *Grams:* "JAKCRO THORNLIEBANK".

"Fullersite"
SLATE FILLER

WHEREVER AN INERT FILLER
IS REQUIRED FULLERSITE
IS THE IDEAL MATERIAL

PENRHYN QUARRIES LTD.
PORT PENRHYN, BANGOR, NORTH WALES

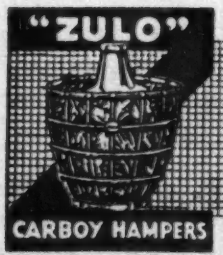


FLAME TRAPS
TO OUR OWN
DESIGN AND SIZE
IN ANY METAL

RICHMOND WELDING COMPANY
ESTABLISHED 1929
RICHMOND ROAD, BRADFORD 7
TELEPHONE 25405

CARRIERS OF
LIQUIDS IN BULK
ACIDS · OILS · SPIRITS
AND GENERAL CHEMICALS

HAROLD WOOD & SONS LTD.
Wormald St. · Heckmondwike
Tel.: Heckmondwike 1011/5
Branch Office: Cranes Close, Nevendon Industrial Estate, Basildon, Essex.
Telephone: Basildon 20511-2.



LEIGH & SONS METAL WORKS LTD.
Orlando St., BOLTON

CARBOYS · PACKED CARBOYS
CARBOY TILTERS AND BARROWS
SAFETY CRATES TOP PROTECTORS

CLASSIFIED ADVERTISEMENTS

CLASSIFIED RATES: All sections 5d. per word. Minimum 8/-. Three or more insertions 4d. per word. Box Number 2/- extra.

SEMI-DISPLAY: 30/- per inch. Three or more insertions 25/- per inch.

FOR SALE

600

MILD STEEL HORIZONTAL JACKETED AUTOCLAVE, 4ft. by 4 ft. 6 in. long on straight with 9 in. dished end of $\frac{3}{8}$ in. and $\frac{1}{4}$ in. plate construction, swing door one end, supported on two mild steel cradles, with pipework, valves and control panels. Motorised wet vacuum pumps and motorised water circulating pumps. TWO AVAILABLE.

VERTICAL SHELL & TUBE REACTOR, comprising main body in $\frac{1}{16}$ in. mild steel, 4 ft. $1\frac{1}{16}$ in. dia. by 8 ft. 3 in. long with outer water cooling jacket in $\frac{1}{16}$ in. mild steel 4 ft. $8\frac{1}{2}$ in. dia. Main body suitable for oil heating. Approx. surface area 1,800 sq. ft. TWO AVAILABLE.

No. 7 SWEETLAND PRESSURE FILTER by Dorr Oliver, filter body cast iron construction, 2 ft. 1 in. dia. by 6 ft. 10 in. long internally, 20 mild steel woven wire leaves spaced at 4 in. with sight glass connections. Suitable 50 p.s.i. w.p.

CAST IRON RECESSED PLATE FILTER PRESS by Johnson, 17 pyramid plates forming 18 cakes $17\frac{1}{2}$ in. sq. by $\frac{1}{2}$ in. thick. Centre feed with individual plate discharge with gunmetal cocks, hand ratchet closing.

EVAPORATOR by A. Johnson, all contact parts in F.M.B. stainless steel with mild steel backing flanges. Body 10G material 6 ft. $10\frac{1}{2}$ in. dia. by 3 ft. 4 in. deep on straight, coned bottom 13 in. deep, bolted on coned top 15 in. high, bolted on vapour section 10G material. Main body fitted perforated spray coils, battery of steam 'U' coils suitable 50 p.s.i. w.p. Usual header and connections, thermometer pockets, level gauge, etc. Mounted on mild steel base.

TWIN ROLL BUFLOVAK DRIER by Consolidated Products of U.S.A., rolls 100 in. by 32 in. suitable 100 p.s.i. w.p. Drive through reduction gearing from 5 h.p. 400/3/50 cycles motor. Roll speed 5 r.p.m., take off speed approx. 40 f.p.m. Fitted adjustable scraper knives and aluminium hood. TWO AVAILABLE.

VERTICAL TOTALLY ENCLOSED BLUE GLASS LINED VESSEL by Pfaudler, 3 ft. 6 in. dia. by 4 ft. deep, dished top and bottom. Sight glass and cocks, fitted. Mounted on adjustable legs. FOUR AVAILABLE.

UNUSED STAINLESS STEEL JACKETED TILTING MIXING PAN by Brierley, Collier & Hartley, inner pan 3 ft. 4 in. by 2 ft. 8 in. with hemispherical bottom. Stainless steel anchor type agitator overdriven through gearing by hydraulic motor. Max. pressure 1,500 p.s.i. Jacketed pouring lip, tilting by handwheel through gearing with counterbalanced weights. Supported in 'A' frames on base. TWO AVAILABLE.

COMPLETE BALL MILL GRINDING PLANT by International Combustion, comprising 8 ft. by 48 in. chrome steel lined Hardinge Ball Mill driven by 220 h.p. motor with Feed Hopper, Constant Weight Belt Feeder, Cyclone, Double Cone Separator, motorised Fan, trunking, supporting steelwork and explosion safety device. TWO AVAILABLE.

GEORGE COHEN SONS & CO. LTD.,
Wood Lane, London, W.12
Tel: Shepherds Bush 2070
Stanningley, Nr. Leeds
Tel: Pudsey 2241

FOR SALE: continued

600

MODERN BOILER PLANT AVAILABLE EX-SITE HEREFORD

FIVE—EDWIN DANKS Horizontal Double-pass Economic Boilers, 9 ft. 9 in. dia. by 15 ft. 6 in. over tubeplates by 19 ft. 6 in. overall; evaporation 12,000 lb./hr.; 120 p.s.i.; with fittings, mechanical stokers, I. D. Fans; also Feed Pumps, Tanks, Instrument Panel, Coal-handling Plant.

GEORGE COHEN SONS & CO. LTD.,
Wood Lane, London, W.12.
(Shepherds Bush 2070)
Stanningley, Nr. Leeds.
(Pudsey 2241)

PATENTS

The proprietor of British Patent No. 737822, entitled "Method of Separating Dispersed Matter from Fluid Masses", offers same for license or otherwise to ensure practical working in Great Britain. Inquiries to Singer, Stern & Carlberg, 140 South Dearborn Street, Chicago 3, Illinois, U.S.A.

The proprietor of British Patent No. 646916, entitled "Improvements in or Relating to Sulphur" offers same for license or otherwise to ensure practical working in Great Britain. Inquiries to Singer, Stern & Carlberg, 140 South Dearborn Street, Chicago 3, Illinois, U.S.A.

PLANT AND MACHINERY FOR SALE

Baker-Perkins Class BB "Double Naben" Bladed Steam Jacketed Mixers. Four—size 12 and Three—size 11, of 20 and 8 gallons respectively.

Oil Jacketed Double Trough Mixer 48 in. by 36 in. by 29 in. deep. Paddle Blades. Bottom Outlets.

Barron 'U' Sifter Mixer 96 in. by 33 in. by 33 in. with 10 H.P. A.C. Motor.

Gardner 'U' Sifter-Mixers 66 in. by 24 in. by 24 in. with 5 H.P. A.C. Motors. Four available, of modern streamlined design.

Horizontal 'U' Trough Mixers 48 in. by 18 in. by 22 in. Three —Tilting type, Paddle Blades. Glanded.

Over-Arm Twin-Blade, Tilting, 30 gallon Mixers with 3 H.P. Geared Motors. Five available.

Lying at our No. 2 Depot, Willow Tree Works, Swallowfield, Berkshire.

Apply: Winkworth Machinery Limited, 65 High Street, Staines, Middlesex. Telephone 55951.

VACUUM PUMP by Hick, Hargreaves. Single stage, water-cooled, rotary, 28 in. Hg. 1,450 r.p.m., 100 c. ft. per minute. 7 h.p. motor, 400/440/3/50 and starter; direct coupled on combined bedplate. Excellent condition.
Apply: Barber's, 72 Park Road, Hampton Hill, Middx. Phone: Molesey 3196.

BOX NUMBERS: Reply c/o "Chemical Age" • Bouverie House • Fleet Street EC4.

PLANT AND MACHINERY FOR SALE: continued

Phone 55298 Staines

Stainless Steel Jac. Cyl. Mixers 50, 100 & 150 gallons.
Stainless Steel Vac. 'Z' blade Mixer 3 ft. by 3 ft. by 3 ft., 40 h.p. A.C.
"Steelshaw" Porcelain Lined Ball Mills, 4 ft. by 3 ft. & 5 ft. by 4 ft. dia.
Enamel lined Jac. Reactors 2 ft. 6 in. by 3 ft. dia.
(3) 10,000 gall. Welded Steel Cyl. Enc. Tanks.
"Johnson" Jac. Filter Press, 8 plates, 9 frames 25 in. sq.
"Johnson" Lab. Filter Press, 4 plates 5 frames 9 in. sq., with pump.
Steel Cased Fan 18 in. inlet *Water Cooled Bearings*, 12½ h.p. A.C. 24 in. dia. "Flameproof" Axial Flo Fan, 2 h.p. 400/3/50.

Send for Lists

HARRY H. GARDAM & CO. LTD.,
100 CHURCH STREET, STAINES

Three Lead lined **STEEL TANKS**, 14,000 galls., 9 ft. diam. by 35 ft. long.

Three Lead lined **STEEL TANKS**, 9,500 galls., 13 ft. 6 in. diam. by 10 ft. high.

Two **NICKEL SILVER TANKS**, 6,750 galls., 8 ft. diam. by 23 ft. 3 in.

Brand New **COCHRAN** Vertical and **ECONOMIC** Self-contained **STEAM BOILERS** in stock, also all sizes reconditioned and guaranteed. List on request.

STAINLESS STEEL TANKS, PANS, CONDENSERS, PLATES, VALVES AND COCKS. Very wide selection.

FRED WATKINS (ENGINEERING) LTD.,
COLEFORD, GLOS.
Phone: Coleford 2271/2.

SITUATIONS VACANT

MARCHON PRODUCTS LIMITED
WHITEHAVEN

A Member of the Albright and Wilson Group of Companies

There is a vacancy for a

SENIOR CHEMICAL ENGINEER

Duties will embrace design of new chemical plant, improvement of existing plant, examination of plant efficiencies, operating procedures and supervision of staff.

The appointment should be particularly attractive to graduates aged 27-35 years with Honours Degree or equivalent and preferably with plant experience.

The commencing salary will be commensurate with the qualifications required. There is an excellent Pension and Life Assurance Scheme, and where necessary assistance can be given in connection with house purchase.

Whitehaven is attractively situated on the fringe of the Lake District and the Solway coast.

Applicants please write in confidence to the Personnel Manager.

A large engineering group expanding its interests in the Food and Chemical Industry seeks the services of a first-class technical representative for the marketing of its specialist process plant. Preferably applicants should have established connections in the Food Processing Industry and/or a sound training in the application of spray drying or fine grinding techniques. Write in confidence giving full details to Sales Director, Steels Engineering Installations Ltd., 143 Sloane Street, London, S.W.1.

SITUATIONS VACANT: continued

TECHNICAL OFFICER required by well established Company of Chemical Engineers. Applicants must possess sound knowledge and experience of Chemical Descaling and Pre-service Cleaning. Preference will be given to applicants possessing qualifications in Chemistry, as part of duties will be control of Works Laboratory. Salary commensurate with experience and qualifications. Please reply giving full particulars of age, experience and qualifications to address below. All applications will be treated with strict confidence. General Manager, CLENSOL Limited, Fowler Road, Hainault, Ilford, Essex.

WORK WANTED & OFFERED

CRUSHING, GRINDING, MIXING and DRYING for the trade
THE CRACK PULVERISING MILLS LTD.

Plantation House,
Mincing Lane,
London, E.C.2

PULVERISING of every description of chemical and other materials. Collections, storage, deliveries. **THOMAS HILL-JONES, LIMITED, INVICTA WORKS, BOW COMMON LANE, LONDON, E.3. (TELEPHONE: EAST 3285.)**

Chemical Age
—SPECIAL—
ISSUES
for
1961

ACHEMA
PREVIEW EXHIBITION ISSUE
JUNE 10

●

LABORATORY FURNISHING and SCIENTIFIC INSTRUMENT ISSUE
JUNE 24

●

CHEMICAL PLANT and EQUIPMENT ISSUE
SEPTEMBER 23

●

EXPORT ISSUE
OCTOBER 28

Full details of these important issues will be supplied on application to :-

The Manager
CHEMICAL AGE
154 FLEET STREET · LONDON, E.C.4
Fleet Street 3216 (26 lines)

Chemical Age Enquiry Service

For fuller details of equipment, apparatus, chemicals etc., in the advertisement or editorial page of Chemical Age, fill in the coupons below, ONE PER ENQUIRY, and return to us.

Please send further details about .....
.....
.....
mentioned on page .....*of this issue.*
Name ..... *Position* .....
Firm .....
Address .....
.....
Chemical Age Enquiry Service.

Please send further details about .....
.....
.....
mentioned on page .....*of this issue.*
Name ..... *Position* .....
Firm .....
Address .....
.....
Chemical Age Enquiry Service.

Please send further details about .....
.....
.....
mentioned on page .....*of this issue.*
Name ..... *Position* .....
Firm .....
Address .....
.....
Chemical Age Enquiry Service.

★ *Detach this page complete then fold as marked overleaf to use the post-paid reply folder*

2nd FOLD

Postage will be paid by the Licensee

No Postage Stamp necessary if posted in Great Britain or Northern Ireland

BUSINESS REPLY FOLDER
Licence No. 2501

CHEMICAL AGE
154-160 FLEET STREET
LONDON, E.C.4

1st FOLD

3rd FOLD

Chemical Age

ENQUIRY SERVICE

★

- *This is a special service for readers of*
  CHEMICAL AGE
- *It is designed to give fuller information on equipment, apparatus, chemicals etc., mentioned in this issue—whether in the editorial text or in an advertisement*
- *Cut out the whole of this page, fold as instructed with post-paid address on the outside*

★

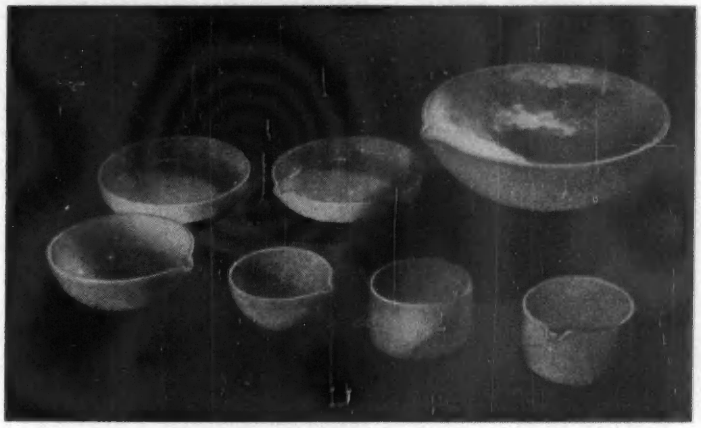
Chemical Age
154 Fleet Street, London, E.C.4
Tel.: Fleet Street 3212

CUT ALONG THIS DOTTED LINE

VITREOSIL

PURE FUSED SILICA LABORATORY WARE

We also manufacture an extensive range of Vitreosil Industrial Ware



- Highly resistant to thermal shock.
- Completely inert to all acids except hydrofluoric.
- Standard equipment for ashing determinations.
- For repeated use up to 1050°C.

LEAFLETS AVAILABLE ON REQUEST

TSL

THE THERMAL SYNDICATE LTD.

P.O. Box No. 6. WALLSEND, NORTHUMBERLAND *Telephone: Wallsend 62-3242/3*

LONDON: 9, BERKELEY STREET, W.1. *Telephone: Hyde Park 1711/2*

acids

PURE & COMMERCIAL

for all purposes . . .

SULPHURIC
OLEUM
BATTERY
NITRIC
HYDROCHLORIC
DIPPING ACID
DISTILLED WATER (PURE)

SPENCER CHAPMAN & MESSEL LTD

BORAX HOUSE · CARLISLE PLACE · LONDON S.W.1 Tel.: Tate Gallery 8215 (4 lines) Works: Silvertown E16

always in the public eye

A *Rheemcote* STEEL DRUM

is more than a container – it is a travelling poster.

Have your drums lithographed in any number of colours with your own design, and

LET YOUR PRODUCT SELL ITSELF

Enquiries to **RHEEM LYSAGHT LIMITED** *St. Vincent's Works, Bristol 2*
Telephone 77601. Grams: Lysaght Bristol

Printed in Great Britain by THE PRESS AT COOMBELANDS LTD., Addlestone, Surrey, and published by BENN BROTHERS LTD., at Bouverie House, 154 Fleet Street, E.C.4. Registered at the General Post Office. Entered as Second Class Matter at the New York U.S.A., Post Office.